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Correspondence.—Wishing to make this Journal a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of these subjects a pleasure or a profession.

CONTENTS.

☞ An asterisk (*) denotes an illustrated article

American Gas Light Association..... 241
EDITORIALS—
Storage of Electricity..... 241
Fourth Annual Meeting of the Western Gas Association..... 242
Second Annual Meeting of the Central New York Gas Engineers' Association..... 242
Obituary, Henry Budd..... 242
American Water Works Association..... 242
Siemens Large Burners*..... 243
The Value of Paraffin Oil as an Illuminant Compared with Gas..... 244
Operations of the Paris Gas Company for 1880..... 247
Preserving Wood..... 247
Second Annual Meeting of the Central New York Gas Engineers Association..... 248
The Burning of the Theater at Nice and the Magasins du Printemps at Paris..... 249
The Use of Gas for Cooking and Heating..... 250
Corrosion of Lead Pipes by Lime-Mortar and Cement..... 251
A Remarkable Corporation..... 252
Extinction of the Brush Lights in London..... 252
Cost of Water Works in Principal Cities of the United States..... 252
Reduction in Price of Gas..... 252
Dust, Fogs and Clouds..... 253
Gain in Weight by Combustion..... 253

[OFFICIAL NOTICE.]

American Gas Light Association.

OFFICE AMERICAN GAS LIGHT ASSOCIATION,
142 CHAMBERS STREET, NEW YORK.

To the Members of the Association:

The Ninth Annual Meeting of the American Gas Light Association will be held in Boston, on Wednesday, Oct. 19th, and continue for three days.

Members of the Association are earnestly requested to prepare papers upon the many topics of general interest, to be read at that meeting. The Secretary counts upon the active co-operation of the members in his efforts to render the meeting of marked value.

WM. HENRY WHITE,
Secretary.

THE STORAGE OF ELECTRICITY.

We had for some time expected to see in the daily papers flaming accounts of the storage of electricity by means of the accumulators invented by M. Camille Faure. These accumulators are the development of the ten years old invention of M. Gaston Planté, who is said to have created, so to speak, a new branch of electricity. Our anticipations were, therefore, not disappointed in reading the telegram, by the French Atlantic Cable, to one of our evening papers announcing the delivery to Sir William Thomson, at Glasgow, of a square wooden box, with a capacity of one cubic foot, weighing about seventy-five pounds, and containing a Faure battery, or pile secondaire, that had been charged with electricity, in Paris, seventy-two hours before.

The *Journal des Usines a Gaz* says of this invention:

"It consists of a secondary battery or accumulator, permitting the storage of the electricity produced by any electro-motor. This apparatus is rightly called an electrical transformer in distinction to a generator of electricity. Generators of electricity, whatever they may do beside, produce a current furnishing a certain *quantity* with a certain *tension*; now the different applications of electricity demand sometimes a great quantity of electricity with a feeble tension, sometimes a small quantity with a high tension, and the transformers of electricity have the capacity of increasing one of these properties at the expense of the other, in the same manner that, in mechanics, we transform speed into power, or power into speed, as necessity demands. Electrical transformers receive electricity and deliver it, in trans forming it, either in quantity or tension. These machines are, therefore, accumulators, analogous to hydraulic accumulators, or reservoirs of compressed air, which are utilized in mechanics."

The battery of Planté, which consisted of lead plates with an area of about five and a-half square feet, would contain electrical energy sufficient to heat to redness a platinum wire about three inches long and one-twenty-fifth of an inch in diameter, for a time not to exceed ten minutes. These figures indicate a very large amount of material and expense to do a very limited amount of work.

It appears that the greater capacity for storage of the Faure battery is due to the layers of spongy lead by which his electrodes are covered, and that this spongy lead is difficult to prepare and requires a long time before it can be be made ready for the battery so as to work efficiently. The arrangement of Faure's battery consists of two sheets of lead, both of which are covered with a layer of red lead or any other insoluble oxide of lead; these sheets are surrounded, and closely wrapped in felt, the felt being solidly fastened to the lead. The two electrodes are then placed in water containing about ten per cent. of sulphuric acid.

To charge this accumulator it is necessary to connect the electrodes with any generator of electricity, the more powerful the generator the less the time required for the saturation, the less powerful the generator the more time required, but a generator furnishing even a very feeble current is capable of charging. The action taking place in the accumulator is as follows:

When the current passes into the accumulator the red lead on the positive electrode is changed into the peroxide of lead, and is reduced into metallic lead on the negative electrode, and this goes on until the charging is completed. When the electricity is being drawn off, or discharged, the

lead takes the same form it had before charging, the action and reaction seeming to be quite complete.

According to the report, in *la Presse*, of the meeting of the Societé d'Encouragement, at which the Faure accumulator was exhibited, the inventor stated—

"As to the efficiency of these accumulators it may be, under the best conditions (it is always under these we endeavor to place ourselves), about 80 per cent. after the two transformations." In other words, under the most favorable conditions, there is a loss of twenty per cent. of energy in storing the current.

This statement is confirmed by the authority of M. Dumas, who puts the loss at not less than twenty per cent.; he also states to the Academy des Sciences, that a Faure pile weighing one hundred and sixty-five pounds could hold sufficient electricity to furnish exterior work of one horse power during one hour.

A company has been organized in Paris, with a daring speculator at its head, and is looking for capital to develop this apparatus for all kinds of power and for light. *L'Economic Financiere*, of Brussels, comments upon the company, its organizer, and the apparatus, as follows :

"In conclusion, our conviction is that the pile Reynier is a success of the laboratory, and the Faure accumulator a scientific toy. Far from solving an industrial difficulty, it makes it more complicated. It is very costly, and will not even be applicable to a sewing machine. What M. Phillipart has shown at the Bourse of Brussels is not at all convincing. In order to drive an electro-motor doing no work, and to light from time to time a single lamp during an hour and a-half, he had to use a number of his accumulators. In order to be convincing it is necessary to extend the trials long enough to prove that the motor does not break down, and, besides, to practically demonstrate the exactness of his calculations. He will not do it."

This invention, viewed as a scientific development and progress, is remarkable, and is well worthy of study and attention. As to the practical results obtainable from such an apparatus, that is another matter altogether, irrespective of the cost, and the large loss of power by the use of such an apparatus, is to be considered the question of its reliability. The practical and economical storage of large quantities of electricity would, of course, be a gain and advantage to all interested in the production and distribution of electric currents, as it would, (provided the holders of electricity did not cost too much) reduce the amount of capital now required for the plant to generate electric currents to meet the demand at any time, it might also tend to render the distribution of the currents, what they now are not, even and reliable.

That the successful storage of electricity is an impossibility we do not believe, but it is still a development for the future. When that future comes it by no means follows that it will place electricity in a position seriously to compete with gas. We believe that the system of gas lighting is scientific and progressive, not as progressive as we wish and think it must be; and that it is possessed of present and most promising prospective advantages, that will enable it to hold its lead in the future as in the past.

FOURTH ANNUAL MEETING OF THE WESTERN GAS ASSOCIATION.

The Fourth Annual Meeting of the Western Gas Association was held in St. Louis, Mo., on the 11th, 12th, and 13th of May. The sessions of the Association were held in the Laclede Hotel, and were very largely attended.

The Association was called to order, on the morning of the 11th, with the President, Thos. Butterworth, of Rockford, Ill., in the Chair. The Secretary, Lee A. Hall, of St. Louis, Mo., recorded. Among the gentlemen present, by invitation of the Association, were Mr. William H. Price, President of the American Gas Light Association, Messrs. William W. Goodwin and P. Munzinger, of Philadelphia, and others. A special committee consisting of Messrs. Howard and Starr was appointed to introduce them to the Convention. Several new members were elected.

The President's Address was able and practical, and was very cordially received.

A paper, from Mr. Geo. Shepard Page, of New York, on "Coal Tar Products," was read by the Secretary. Papers on "Heat, its Philosophy and Economical Use," "Gas Furnaces," "Treatment of Gas after Leaving Retorts," and others, were also read, and considerable discussion on each topic was had.

Most of the third day was employed in visiting various points of interest in the city, after which the Association adjourned. The next meeting will be held in Chicago.

A full report of the proceedings of the Association will be given in the JOURNAL.

M. PHILIPPE GOELZER, a gentleman who was prominently identified with French gas intersts, died recently in Paris, France.

SECOND ANNUAL MEETING OF THE CENTRAL NEW YORK GAS ENGINEERS ASSOCIATION.

The Second Annual Meeting of this Association was held at the Osborne House, Auburn, New York, on Wednesday, May 18th. The President, Mr. A. C. Wood, of Syracuse, occupied the Chair, and the Secretary's desk was in charge of Mr. C. A. White, of Rochester.

Captain W. Henry White, Secretary of the American Gas Light Association, and Mr. A. B. Slater, of Providence, R. I., were present during the meeting. The official report of the proceedings of the morning session will be found on page 248 of this number.

OBITUARY.

HENRY BUDD.

It is with regret that we announce to our readers the demise of Mr. Henry Budd, of Philadelphia. This gentlemen was connected with the Northern Liberties Gas Light Company for over thirty years, and during 25 years of that time he occupied the position of President of the company.

Mr. Budd was born in Philadelphia, in 1810, and was a descendant of the Rev. Thomas Budd, a minister of the Church of England. The children of this Thomas Budd emigrated to this country, and the father of the gentleman who is the subject of this sketch settled in Philadelphia.

At the age of 18 he entered the mercantile house of T. Latimer & Co., and in 1836 he formed a copartnership with Thos. Ridgway. This firm became very successful in business, Mr. Ridgway retiring in 1850, and Seth I. Comly taking his place. Becoming impressed with the lack of system in the flour trade, Mr. Budd held a conference with twelve other gentlemen in that business, and from this meeting resulted the "Corn Exchange," the name being subsequently changed to the "Commercial Exchange." Besides his connection with the Northern Liberties Gas Light Company, Mr. Budd was an active member of the Board of Trade, a director of the Penn National Bank, and for five years was President of the Green and Coates Street Passenger Railway Company. He also represented the Thirteenth ward in Common Council, and was vice-President of the Fire Insurance Company of Philadelphia.

He was a man of more than ordinary ability, liberally educated, a gentleman of culture and refinement, and his kindly nature endeared him to all who had the pleasure of knowing him either in a business or social capacity.

His connection with the Northern Liberties Gas Light Company made him well known to the members of the profession throughout the South and West, and his valuable and energetic services in the administration of the affairs of that Company will be long remembered by those identified with its interests.

AMERICAN WATER WORKS ASSOCIATION.

We have received a copy of the "Journal of the Proceedings of the First Annual Session of the American Water Works Association," which session was held in the Engineers' Hall of the Washington University, St. Louis, Mo., on March 29th, 30th, and 31st, 1881. In response to the call which was issued, some twenty-five gentlemen met at the above time and place and formed a permanent organization, the object of which, as stated in the preamble, is for the purpose of forming an association for the exchange of information pertaining to the management of water works, for the mutual advancement of consumers and water companies, and for the purpose of securing uniformity and economy in the operation of water works.

Colonel J. T. Foster, of Chicago, Ills., was elected President, H. D. Wood, of Hannibal, Mo., Secretary, and J. H. Decker, of Hannibal, Mo., Treasurer. Columbus, Ohio, was chosen as the place of next meeting, which is to be held on the second Thursday of March, 1882.

A very interesting discussion was held on the respective merits of several forms of fuel-saving furnaces, and much valuable information in regard to the different systems was elicited. Discussion was also had upon service-pipes, water meters and wastage.

THE BASIC PROCESS FOR THE DEPHOSPHORIZATION OF IRON.—This process which has occupied of late so much of the attention of metallurgists, is reported to have been purchased by what is known as the Bessemer Association, which carries with it the Thomas and Snelus patents for the United States, and all the rights and privileges owned by Mr. Thomas and his associates, so far as they relate to this country. The basic process, it may be remembered, is a method which has solved the problem of making merchantable steel by the Bessemer process from phosphoretic irons, and has, therefore, very materially extended the utility of the Bessemer process. Its practicability has been amply demonstrated abroad, where it is now in successful operation, and we may soon expect to see it in operation here.—*Manf. and Builder.*

[A paper read before the Society of Gas Lighting.]

Siemens' Large Burners.

By G. W. Dresser, C.E.

The regenerative burner, as invented by Siemens, seems to give much better results than anything heretofore produced for giving either moderately small or very large lights. The proportion of saving increases with the size of the burner and the amount of gas consumed. As to the point where the maximum of economy would be reached, the experiments thus far made do not fully determine; but an examination of the following table will show that, within the limits that any ordinary use of gas would demand, there is a decided advantage in the large over the small sizes.

Feet per Hour Consumed.	Illuminating Power. Candles.	Consumption per Hour per Candle.
11	45 to 65	0.204 cubic feet.
22	117 to 135	0.174 "
28	180 to 198	0.148 "
56	414 to 432	0.132 "
75	about 700	0.107 "
92	about 936	0.098 "
140	about 1800	0.080 "

It must be borne in mind that the gas used in the above tests was Paris gas, which averages about 12 candles when tested by our standards.

These figures are not from tests made by myself, but are figures given by the Company, and were made by Mr. LeBlanc, engineer and inspector of lighting on the part of the city of Paris, and also published in the proceedings of the French Society of Civil Engineers in a paper read by Mr. E. Cornault, on January 21, 1881. The showing is a remarkable one. While in the smallest one, using 11 feet, there are 5 candles obtained for each foot of gas per hour, in the one using 56 feet per hour nearly 7 candles per foot are obtained, and in the one consuming 140 feet per hour, 12.5 candles. There is no doubt that the principle brought to bear in the construction of these burners—viz., heating both the air and the gas before combustion—is shown to be a correct one when properly carried out. And when we add to this the fact that this heating is done by the products of combustion, and also that these products, after having been thus utilized, are removed from the apartment where the burner is used, if in the house, or carried off in the air if out of doors, it would appear that their practical operation must result in numerous benefits, both in economy of expenditure and in lessening the ill effects upon the atmosphere that are said to result from the combustion of gas. As an aid to ventilation, it must prove most useful in places of large assemblages, as well as making it perfectly possible to illuminate large halls from above in the most perfect manner.

The construction of the burner itself is well shown in the accompanying cut.

The gas comes in at the side and passes into the annular chamber B,

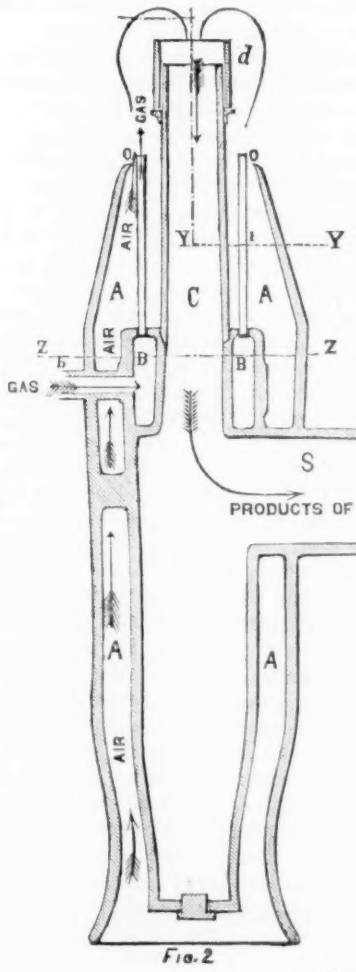

Fig. 2

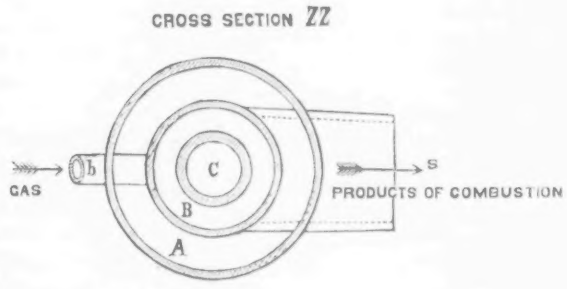

Fig. 3

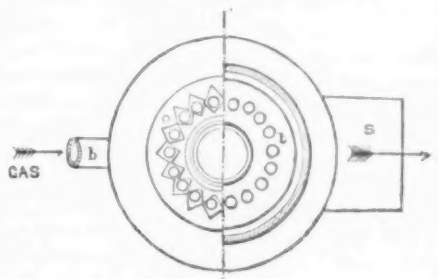

Fig. 4

22 CUBIC FEET PER HOUR.

from the top of which it is led by small tubes arranged in a circle to the point O, where the combustion begins, and where the air unites with the gas. The air coming from chambers A has also been heated by the products of combustion passing *down* the tube C and out at the side S. Of course, some time must elapse from the lighting to warm the apparatus and establish the conditions necessary to the proper motion of the gas, air, and products of combustion, after which the most perfect regularity and steadiness is obtained.

In Fig. 4 is shown the arrangement of the tubes and a notched arrangement outside (which slips over) for dividing and combining the currents of air and gas. When lighted the flame goes up and turns around the upper edge D, which is a porcelain ring, and is drawn down through the tube C, heating the whole apparatus.

These lamps are made of cast brass mainly, and the tubes from B to O are fitted in afterward. The products of combustion may be taken in a pipe to any point desired. Of course, there is a good deal of heat evolved, but a proper arrangement will render this much less perceptible in its effects than the heat would be from the same amount of light obtained from the the ordinary burner.

As to the purposes to which it may be adapted. Of course, the inventor simply produced the burner. The problem now is how to adapt it to ordinary daily use in such a form as not to offend good taste or mar the beauty

of the apartment where it may be desired; for no matter how economical a thing may be, if it is ugly and offensive in form or design, there is little hope of application. Beauty and utility must combine with economy if those people who burn the most gas are to be induced to apply the improvements which science may evolve. This problem is in a fair way to a satisfactory solution, for the matter has been taken up by a company in Paris, of which the well-known gas engineer and manager, Mr. A. Ellissen, is the head. Experiments are constantly going on, directed by scientific intelligence, and studies are being made which already have resulted in forms of beautiful brackets, pendants, etc., to which the smaller lamps are to be attached.

For use in street lighting these burners must be of great utility wherever "more light" is demanded, and if lights of great power are required they can be produced with gas in these burners to an extent only limited by the amount of money that is available for expenditure in this direction; and we venture to say that, whatever expenditure, more light for the same money can be given with a more satisfactory result by the use of gas in these burners than by electricity. (If the price of gas is $2 per 1000 feet, 140 feet will cost 28 cents, for which an *actual* illuminating power of 1800 candles may be obtained for one hour—steady, clear, warm, pleasant light.)

The trouble of adapting these burners to a form of lantern that shall be ornamental, and at the same time suited for peculiar requirements, is being rapidly solved. In fact the smaller lamps could be put into the ordinary boulevard lantern, while the larger ones simply require a proper adjustment between the dimensions required, the quantity of air necessary, and the draught or chimney at the top.

In a few days I will send the members of the Society pamphlets showing some of the forms already designed for the practical application of these lamps.

On the evening of the 4th of May I was present at an experiment of a novel character in lighting. The Champs de Mars, the ground on which the exposition of 1878 was held, is reserved as a military parade or drill ground. Its width is about 1,500 feet, and its length two or three times as much. When finished this is to be a level plain, for exercising, drilling, or manœuvring troops of all arms—infantry, artillery, and cavalry. Now, it can be easily understood that a series of lamp posts, 50 feet apart, as is usual in the parks and main streets of Paris, would seriously interfere with tactical manœuvres. Moreover, it might be necessary to use this ground at night, and consequently it must be lighted without any posts or apparatus on the field that would be in the way. A series of experiments have been instituted, under the direction of an engineer of the Paris Gas Company, to determine a solution of this problem. It was at a test of the working of an arrangement for this purpose that I was present.

A lamp post was mounted on a pillar of masonry at the entrance of the field, known as the Port Rapt, so arranged that the burner would be about 25 feet high. The burner was one consuming 56 feet per hour, of 430 candle power. Around the burner (with no lantern) was arranged an iron frame work about 5 feet cube, to which, on top, at the sides, and in the rear, were attached plain flat mirrors in wooden frames about 1 foot wide, so arranged that they could be turned at any angle. Those at the sides and on top stood at about 45°; those at the back were vertical. The effect was to throw all the rays forward, and disperse them considerably laterally.

At a distance of 330 feet ordinary print could be read. I happened to have a way-bill, or express company's receipt, which was easily read. Half way across the field, or 750 feet, the time was easily told by an ordinary watch, and the shadows were very distinct. The sky was overcast at the time, and rain fell before the experiment was finished. It was evident that by arranging a sufficient number of these lights along the two sides of the field the whole ground would be sufficiently illuminated for all requirements. Within 150 or 200 feet of the lamp there was ample light for carrying on any mechanical work. The object to be obtained here was unique, but, novel as were the conditions, I am of the opinion that they could all be met by the use of gas in these lamps.

A large manufactory near Paris, where the electric light has been in use for some time, has applied to have the works fitted with these Siemens lamps, to replace the electric lights.

For street lighting, one of these lamps, for double the expenditure of gas, will give about five times the amount of light.

The details of application are not yet completed, but doubtless they will be before long; and this will be another gas triumph due directly to the appearance of the electric light. It is to be hoped that it will not be long before some of these lamps may be seen in New York and vicinity.

Cheese Cement for Mending China, etc.—Take skim milk cheese, cut it in slices and boil it in water. Wash it in cold water and knead it in warm water several times. Place it warm on a levigating stone and knead it with quick-lime.

[From the London "Journal of Gas Lighting."]

The Value of Paraffin Oil as an Illuminant, Compared with Coal Gas.

By Mr. F. W. Hartley, A. Inst. C.E.

Several statements of experimental results have been published upon this subject, in which it has been made to appear that paraffin oil, as it is usually burned for lighting purposes, is less costly than common coal gas. In the course of some experimental investigations upon which I was engaged about 18 months ago, I was led to doubt the correctness of the conclusions arrived at, in consequence of the results that I obtained with several good and well trimmed paraffin burners, which I used in order to ascertain the lighting value of paraffin oil per gallon, indicating an economic inferiority to coal gas. Repugnant as was the odor of paraffin oil to me at that time, I resolved to overcome my antipathy to it, and to carry out, at intervals, as time would permit, a series of trials with a selection of burners which were fairly representative of the best types. I soon became somewhat indifferent to the odor of the oil, although I cannot say I have grown to enjoy it. I am still painfully affected when I enter a room in which a badly trimmed lamp, slightly smoking, has been burning for some time, as two effects are produced—namely, an oppressive constriction across the forhead, and an irritation of the organs of respiration to a degree little less than that caused by an atmosphere tainted by the products from a Bunsen gas burner which has "lighted back." Hence, with all the paraffin burners which were used, great care was taken to so trim their wicks that the flames were well formed and the oil was burned perfectly, although in two or three cases it was found needful, in order to obtain the highest results with well-shaped flames, to approach so nearly to the smoking point that the least current of air accross the lamps caused smoke to be evolved.

Judging from my experience among friends and acquaintances, the public do not take nearly enough trouble and care in the trimming of these lamps, and as a consequence fail to realize anything like the most economic effects. Hence, in instituting comparisons as to the economic value of the two materials in question, it is manifestly unfair to use a paraffin burner under the most refined conditions, and set the results so obtained in opposition to a depreciated estimation of the power of coal gas; and yet this is precisely what has been done. In all the large towns, in most of the smaller ones, and even in some villages, gas of fully 15 to 16 candles illuminating power is supplied; but the standard adopted by the reporters on petroleum lamps is 12 candles only, and notwithstanding that I think the 12-candle power too low as an average for 5 feet per hour consumption, still, as there are small places—some, strange to say, near the coal fields—where inferior gas is supplied, I am quite content to adopt the 12-candle value for gas, and, as will be seen, something lower in certain comparisons, while allowing to the paraffin burners all the advantages due to careful treatment. I also frankly admit that when due care is taken with a good paraffin lamp the light emitted is clear, brilliant, in some cases almost white, and is altogether very beautiful; while if oil of a fine quality be employed, the steadiness of the flame and its uniformity in lighting power during several hours command honest and unprejudiced admiration.

Some of the burners operated with were, with their wicks, bought at shops; others, with wicks, were obtained direct from the makers, who were informed that the burners were to be tested. The wicks were not subject to any special treatment beyond being stored in a warm dry room, and therefore were in such condition as they would be used by the general public; but, as already said, extreme care was taken in trimming, and the lamps were recharged with oil on every occasion of being re-used, while the flames were adjusted to such size as in every case seemed to be most advantageous for the particular burner, except when some flames were deliberately reduced in size, in order to see to what extent a reduction in the rate of burning affected the economic value of the fuel. Such examples are given in Table I., under 1A, 4A, and 8A, which show how greatly the cost per candle power is increased by reducing the total amount of light. The examples 6 and 6A, on the contrary, just indicate the ill effect which results from an attempt to force a burner beyond its powers, the greater light costing more money per candle power.

The paraffin oil employed was of tolerably fine quality, was procured in pints from dealers of the highest respectability, and retailed by them at 2½d. per pint, or at the rate of 1s. 8d. per gallon, which, of course, is what the public have to pay, and not 1s. per gallon, which is the price that those who have instituted comparisons between the cost of lighting by this oil and by coal gas have, for some reason, chosen to elect. It is quite true that the oil may be bought in quantities for 1s. per gallon, and that some retail vendors are willing to supply it by the single gallon for from 1s. 6d. to 1s. 4d.; but the cost of a thing to the consumer is what he can purchase it for in such quantities as he wants, and not what it is sold for in the wholesale market, by gallons, hundredweights, or tons. This is such an elemen-

tary rule in political economy that it seems almost absurd to state it; but I have felt obliged to put the matter of cost in its true position, and notwithstanding that gas forms a general exception to the rule stated; for, in the majority of cases, he who buys 100 cubic feet of gas gets it at as low a price per cubic foot as he who buys a million.

The specific gravity of the various samples of gas used ranged from .7888 to .7928; the mean may therefore be taken as .7908, and one gallon would weigh 53,356 grains. As, however, some samples of paraffin oil weigh very closely upon 8 lbs. to the gallon, it has been assumed, in order to do full justice to the value of the oil, that a gallon weighs 8 lbs., or 56,000 grains, or about 600 grains in excess of the weight of many samples. It need hardly be stated, perhaps, that the light of comparison was a Methven's Illuminating Power Standard, which rendered a constant light to the photometer disc in all the trials. I am happy to be confirmed in my estimation of the value of this standard by the willing testimony of Charles Heisch, Esq., F.C.S., etc., Gas Examiner to the Corporation of the City of London, who, after some months of practical experience with it, says: "The ease and rapidity with which observations can be taken, and the freedom from the irregularities to which even the best candles are liable, render it, in my opinion, a most valuable instrument."

TABLE I.—*Flat Wick Paraffin Lamps.*

Reference Number of Burner.	Width of Wick. Inches.	Illuminating Power.					Grains of Oil burned in One Hour.	Grains of Oil per Hour per Candle Power.	
		Side of Flame.	Edge of Flame.	Mean Power.	Ratio Edge to Side=100.	Ratio Mean to Side=100.		Side of Flame.	Mean Power of Flame.
1	5/8	7.08	5.60	6.34	79.10	89.55	390	55.08	61.50
1A	5/8	4.40	3.60	4.00	81.80	90.90	292	66.36	73.00
2	5/8	5.90	4.00	4.95	67.80	84.00	359	60.84	72.52
3	3/4	7.85	5.78	6.82	73.70	86.90	508	64.71	74.40
4	3/4	8.03	6.32	7.17	78.80	89.30	507	63.13	70.70
4A	3/4	4.20	3.50	3.85	83.33	91.66	344	81.90	89.38
5	7/8	9.70	7.55	8.63	77.83	88.97	524	54.00	60.72
6	1 1-16	11.70	7.52	9.61	64.27	82.14	610	52.13	62.03
6A	1 1-16	10.00	6.44	8.22	64.40	82.00	537	53.70	65.32
7	1 1/8	19.50	9.80	14.65	50.25	75.12	1183	60.66	80.75
7A	1 1/8	15.86	9.34	12.60	58·90	79.45	938	59.14	74.44
8	1 1/2	12.03	8.60	10.32	71.50	85.79	714	59.35	69.18
8A	1 1/2	9.76	7.56	8.66	77.46	88.73	658	67.42	75.98

TABLE II.—*Duplex Paraffin Lamps.*

Reference Number of Burner.	Width of Wick. Inches.	Illuminating Power.					Grains of Oil burned in One Hour.	Grains of Oil per Hour per Candle Power.	
		Side of Flame.	Edge of Flame.	Mean Power.	Ratio Edge to Side=100.	Ratio Mean to Side=100.		Side of Flame.	Mean Power of Flame.
9	1 1/4	24.10	14.77	19.44	61.28	80.66	1349	56.00	69.39
9A	1 1/4	21.10	14.30	17.70	67.77	84.00	1268	60.01	71.65
10	1 1-16	21.70	14.00	17.85	64.51	82.26	1118	51.52	62.63
10A	1 1-16	19.69	14.00	16.85	71.10	85.57	1006	51.09	59.70
11	1 3-32	19.50	13.90	16.70	71.28	85.64	1059	54.30	63.40
11A	1 3-32	16.60	12.00	14.30	72.28	86.14	996	60.00	69.65
12	1 1/8	19.02	12.04	15.53	63.30	81.65	1226	64.46	78.93

TABLE III.—*Argand Paraffin Lamps.*

Reference Number of Burner.	Diameter of Wick Externally. Inches.	Light in Sperm Candles.	Grains of Oil Burned in One Hour.	Grains of Oil Burned per Hour per Candle Pow'r
13	5-8	8.16	459	56.25
14	15-16	10.85	700	64.52
15	17-16	14.53	755	51.96

The photometer employed was of refined construction, and was provided with every accessory which could facilitate operations and render the indications accurate. The terminal point of the bar was defined by two plumb lines about 23 inches apart. The lamps were placed in such positions that the plumb lines (1) cut the edges of single-wick flames, when their sides were presented to the disc; (2) cut the center line between the two flames when, with duplex burners, the side flames were presented to the disc; (3) cut the middle of the flames when their edges were presented to the disc; and (4) cut the Argand flame centrally.

The flat flames were presented alternately side and edge to the disc, the respective powers recorded, and the ratio afterward reduced from averages. The power of the edge light is a little difficult to determine, with accuracy,

but as the conclusions are based upon averages, they fairly represent the truth. An important fact is brought out by them—namely, that the percentage of light yielded by the edges of such flames is much higher than has been heretofore believed. Two experimenters stated some time since that the edge light of a flat-flame paraffin burner was equal only to about 50 per cent. of the full or side flame; but only in one instance in my experiments was the result so low as this. Here I may observe that there seems to be no absolute proportion between the percentage of edge light and the width of the wick; for although the smaller flames do give a higher percentage, yet burner No. 7 (Table I.), 1⅜-inch wick, gives more than No. 8, with 1¼-inch wick. Neither is there any absolute relation between the width and thickness of a wick and the rate at which the oil burns; very much depending, doubtless, on the quality of the cotton and the manner in which it is plaited, upon the burner, and upon the shape and size of the chimney or glass adopted.

While, however, the powers of edge flames are shown to be high by my tests, the actual value of paraffin oil is proved to be much lower than has been heretofore assumed, and I am fully satisfied that my results show the maximum value of the material to the public.

In instituting comparisons between the cost per candle light with lamps of high power and the cost of gas for the same amount of light, it always seems to have been forgotten or ignored by the experimenters that the lighting power of gas per cubic foot increases with an increased rate of consumption, when burned under proper conditions from suitable burners. Now it is almost as common for consumers to use burners of 6 or even 7 cubic feet per hour consumption as it is for them to use burners of 5 or 4 cubic feet rate. Hence against the depreciated power of the gas with small burners we may fairly set its enhanced power with larger ones. In spite of this fact it is usual to assume that the useful effect to the public is, for 16-candle gas, only about 12 candles. But, for the purposes of some comparisons in the table that follows, I have been content not only to adopt 12-candle power for 5 cubic feet, or 2.4 candles per cubic foot, but in certain other comparisons to go lower, and adopt 2.28 candles per cubic foot, or 11.4 candles for 5 cubic feet. The reason for this is that flat gas flames give, as do the lamp flames, less light from their sides; the edge light, however, of batswing burners used with ordinary coal gas is only, by my tests, 4 to 8 per cent. inferior to the side light, so that the lower standard I have adopted for gas meets extreme cases.

Reverting to the cost of oil, it is true that it can be bought in large quantities (wholesale) at 1s. per gallon or somewhat less, and on inquiring of respectable dealers I have been informed that they are willing to supply a single gallon for 1s. 6d., or two or three gallons at a time at the rate of 1s. 4d. per gallon. Add to the latter price the loss by waste in charging the lamps, etc., the cost for wicks, for new glasses, for they do break—and the absolute cost for lighting with good paraffin oil may be fairly taken to be at the rate of 1s. 6d. per gallon, even to considerable buyers. If labor were also taken into account, 6d. or even 1s. more might well be added.

The following table (IV.) shows the illuminating value in standard sperm candles for one hour of one gallon of paraffin oil with each burner tried; also the quantity of coal gas required to produce an equivalent amount of light and the cost thereof at 3s. 4d. per 1000 cubic feet. As against the side or full flames of the lamps the gas is estimated to yield 2.4 candles' light per cubic foot, or 12 candles' light for 5 cubic feet (columns 4 and 5), and as against the mean powers of the lamps the power of the gas is estimated at 2.28 candles per cubic foot, or only 11.4 candles for 5 cubic feet (columns 6 and 7). Paraffin oil of the quality used is retailed at the rate of 1s. 8d. per gallon by the pint or quart, but by the gallon can be bought of dealers at 1s. 6d. or even 1s. 4d. per gallon.

The following table (IV.) shows clearly that gas, at 3s. 4d. per 1000 cubic feet, and estimated at a low illuminating value, is in every instance less costly than paraffin oil, with the lamps that were tested. It is true that Nos. 10 and 10A indicate, as against gas, a slight superiority with the side light, though only to the extent of the sums of 0.12d. and 0.28d. per gallon; but the apparent advantage vanishes when the mean lighting powers are compared, for then the cost of gas sinks to less than 1s. 4½d., as against the 1s. 6d. for oil—a difference of over 9 per cent. in favor of gas, even when lamps are as carefully treated as those were which are in question. If it be urged that gas cannot be so economical when burned to produce small flames, it can be replied that the same truth holds good with lamps, as witness 1A and 4A in Table I., and the relative cost of gas in Table IV. Further, it can also be said that if the larger burner flames be reduced very much, a greater loss of light power ensues than with the smaller burners, and moreover that under such conditions the large burners tend to produce smell.

Taking the mean values per gallon of oil from the third column of Table IV., for burners which did well up to 12-candle power—viz., Nos. 1, 2, 3, 4, 5, 6, 6A, and 8—the average candle value per gallon will be found to be, in round numbers, 840; this divided by the low estimated power of 2.28 candles per cubic foot of gas gives 368.5 feet, costing, at 3s. 4d. per 1000 feet, 1s. 2.74d., and at 3s. 6d. per 1000 feet 1s. 3.48d., as against the low estimate for oil of 1s. 6d.

TABLE IV.

1. Reference Number of Burners.	2. Value of One Gallon of Oil in Sperm Candles for One Hour. Side Flame.	3. Value of One Gallon of Oil in Sperm Candles for One Hour. Mean Power.	4. Cubic Feet of Gas to yield Light equal to Side Flame of Lamp.	5. Cost of Gas. s. d.	6. Cubic Feet of Gas to yield Light equal to Mean Power of Lamp.	7. Cost of Gas. s. d.
1	1016	911	423	1 4.92	400	1 4.00
1A	844	767	352	1 2.08	336	1 1.44
2	920	772	383	1 3.32	339	1 1.56
3	865	753	361	1 2.44	330	1 1.20
4	888	792	371	1 2.84	348	1 1.92
4A	684	628	285	0 11.40	275	0 11.00
5	1036	923	431	1 5.24	405	1 4.20
6	1074	903	448	1 5.92	396	1 3.84
6A	1043	857	435	1 5.40	376	1 3.04
7	923	693	385	1 3.40	304	1 0.16
7A	946	752	394	1 3.76	330	1 1.20
8	943	809	393	1 3.72	355	1 2.20
8A	831	737	346	1 1.84	323	1 0.92
9	1000	807	417	1 4.68	354	1 2.16
9A	932	782	389	1 3.56	343	1 1.72
10	1087	894	453	1 6.12	392	1 3.68
10A	1096	938	457	1 6.28	411	1 4.44
11	1031	883	430	1 5.20	387	1 3.48
11A	933	804	389	1 3.56	352	1 2.08
12	869	709	362	1 2.48	311	0 1.44

Argand Lamps.

	Value of One Gallon of Oil in Sperm Candles for One Hour.	Cubic Feet of Gas to yield Light equal to the Lamp. 5 ft. = 15 Candles.	Cost of Gas. s. d.
13	995	332	1 1.28
14	868	289	0 11.56
15	1078	359	1 2.36

In the same way the figures for burners Nos. 7, 7A, 9, 9A, 10, 10A, 11, and 11A (excluding the bad one, 12), of more than 12-candle power, give an average value equal to 820 candles. Gas required would be 360 cubic feet, costing, at 3s. 4d. per 1000 feet, 1s. 2.4d., and at 3s. 6d. per 1000 feet, 1s. 3.12d.

Gas at 3s. 6d. per 1000 feet is more than 16 per cent. cheaper than the oil; but it must be remembered that when powerful lights are wanted more than 3-candle power per cubic foot of gas is realized. Dividing 840 by 3, the quotient gives 280 cubic feet only as the quantity of gas needed to afford the same amount of light as one gallon of oil burned from large burners; the gas costing, at 3s. 4d. per 1000 feet, but 11.2d., and at 3s. 6d. per 1000 feet, 11.76d.; so that the oil light would be dearer than gas by more than 50 per cent. under the conditions stated. As regards Argand burners, the economy is unmistakably on the side of gas, as there certainly can be no reason for assuming that these need be used disadvantageously.

In conclusion, it may add to the interest of this article to state some results obtained with paraffin oil used in conjunction with gas. First, the effect produced upon gas by passing it, without bubbling, through a vessel containing some of the oil; paraffin oil not only being totally unfitted for the enrichment of coal gas in this way, but an actual destroyer of its illuminating power. In this respect it acts like the heavy naphthas from coal tar:

	Light Yielded. Sperm Candles.		Per Ct.
Batswing burner, gas delivered in its normal condition	= 16.2	=	100.00
Same burner and rate of gas delivery, but the gas passed through a vessel containing paraffin oil	= 9.0	=	55.55
Loss			44.45
Argand burner, gas delivered in normal condition	= 16.4	=	100.00
Same burner, but gas passed at the same rate through vessel containing paraffin oil	= 11.7	=	71.34
Loss			28.66

The loss is greatest with flat flames, and with any flame the percentage loss increases as the flames become smaller. Thus, with the same Argand referred to above, burning gas at a low rate, and giving a light equal to 8½ candles with normal gas, the reduction in light was 48 per cent.

Vastly different is the effect when a gas flame is combined with a paraffin lamp flame in the manner shown in the annexed illustration—viz., with the gas burner horizontal and the lamp burner vertical. The gas flame striking across and being a little above the wick of the oil burner, the issuing gas carries with it the vaporized oil, the result being the production of a powerful and very economical light. This arrangement is the invention of and is patented by Mr. James Kidd, of St. Bride Street, London. In the careful trials I made with it, the power of the horizontal (so calling it) gas flame was first ascertained in three positions—viz., flame wholly *within* the terminal line of the photometer and wholly *beyond*, and with the center of the flame coinciding. In the same way the power of the compound flame was tested. Deducting the light due to gas alone, the remainder gave the increase due to the paraffin (this being the only way to arrive at a conclusion), and it was found that the light due to a gallon of paraffin oil was over 2300 candles, as compared with 900 candles realized from the side light of a good paraffin burner of about the same width of wick as that used with the gas; so that the lighting power of the oil was 2½ times greater when burned in this way in conjunction with coal gas than when burned by itself.

Operations of the Paris Gas Company for the Year 1880.

EXTRACTS FROM THE ANNUAL REPORT TO THE STOCKHOLDERS.

In accordance with the law, we submit to you the results of our working during the year 1880, and give you the condition of the Company on December 31st last.

The recent experiments in lighting the Rue du Quatre Septembre, and the replacing at a large number of points of the ordinary street burners with gas lights of high illuminating power, seems to have developed a demand for light which constantly increases, and which in 1880 has produced a large increase of consumption. This circumstance, united with the exceptionally favorable conditions for manufacture, both of gas and our residual products, has produced an increase of profits which is made more prominent when compared with the year 1879, because that winter was attended with unusual severity and a depreciation in the price of coke, which had been heaped up for several years at the different works.

We are happy to inform you that the dividend for 1880, while testifying to the new progress of our enterprise, will to a certain extent make up for deficiencies of former years; for it must be borne in mind that from 1875 to 1879 the profits have remained almost stationary, although to provide for coming increase of consumption we have been obliged to issue new capital to the amount of nearly $5,500,000.

Consumption of Gas.—During the year 1880 we have sent out 8,633,535,000 cubic feet of gas, which is an increase over last year of about 136 million cubic feet. * * * The day consumption, which results principally from industrial and domestic uses, amounted to about one-fourth of the total consumption.

Receipts for Gas.—The receipts for gas, which in 1879 amounted to $11,123,918, amounted in 1880 to $12,006,143.

Number of Consumers.—The number of consumers on Dec. 31, 1880, was 148,514—an increase of 9,248 over those of the same day in 1879, and about two-thirds of these new consumers are upon the "Conduites Montantes," showing the great benefits resulting from the expenditures made in putting in the "Conduites Montantes" during the past 10 years.

Public Lighting.—The number of public lamps on Dec. 31 was, in Paris proper, 41,921, and in the suburbs 7,233, a total of 49,154, which is an increase of 3,022 during the year. Of those in the city proper which serve to light the public streets, there are 179 of the model of the "Quatre Septembre," each burning 50 feet of gas per hour, and 152 of the model of the "Place de la République," consuming 30 feet per hour each. These large burners are equivalent to 2,740 five-feet burners, to which may be added 697 other large burners, which are maintained by private consumers at stores, theatres, etc.

"*Conduites Montantes*" have been placed during the year to the number of 1,526, making the whole number 15,415, in 11,819 buildings, which have cost on an average about $120 each; but the amount of gas sold thereby during the year has brought in about $2,000,000, and supplies about 30 per cent. in number of our consumers.

Manufacturing Capacity.—The manufacturing capacity of the Company during the year has been 920 million cubic feet, and we have been able to meet all demands and have a reserve of about 6 per cent. in case of accident or unexpected consumption. It is estimated that in order to meet the requirements of next winter it will be necessary to increase our capacity of production to over 10,000 million cubic feet.

New Pipe Laid.—The new pipe laid from the new works at Clichy to the center of Paris is about 3 miles, of 40 inches diameter, which, added to the other new pipe in the city and suburbs, makes the total of pipe laid about 20 miles. The entire amount of mains reaches the sum of 1,100 miles.

Capital.—During the past year there has been added to the capital account, by expenditure, $2,019,692, which makes the total capital expended up to Dec. 31, 1880, $38,196,052. For this there has been issued in stock $16,800,000, and in bonds $22,349,148, making a total capital of $39,149,148, of which about $900,000 remains unexpended.

RECEIPTS AND EXPENDITURES.

Receipts.

Sales of gas	$12,006,143
" coke	3,270,919
" tar	537,022
" ammonia water	76,475
" chemical products	256,565
Meter rents, stopcocks, etc.	520,071
Other sources	593,780
Total receipts	$17,260,975

Expenditures.

Materials, manufacture, etc	$4,784,200
Service at works	1,362,530
Mains and services	423,179
Central administration and interest	2,140,930
Municipal charges	972,070
State charges	126,114
Total expended	$9,809,023
Excess of receipts over expenses	$7,451,952
Add balance from 1879	36,433
	$7,488,385
Deduct unpaid debts	48,000
	$7,440,385

Of this amount the shareholders are allowed to receive as dividend before the city has any share in profits the sum of $2,480,000. Hence there remains a sum, in round numbers, of $4,960,000, which is to be divided equally between the shareholders and the municipality; so that the city's share of the gas profits for 1880 is $2,480,000, while in this instance it happens that the Company's share of the profits, *in excess* of the stipulated dividend, is exactly equal to that dividend—so that the entire dividend for the year is 74 francs per share, the par value of which is 250 francs.

The above gives the general points of the last annual report. There are many other details which would be of interest were it customary in our system of accounts to go into the minute details, as is commonly done abroad. The price of gas in Paris is $1.75 to private consumers, and one-half that price to the city. There is but one company, and that is a regulated monopoly. Private consumers burn as little gas as possible, and it is seldom used in parlors and sleeping rooms. In fact, this article is written by the glowing effulgence of two candles, and even this extravagance of sperm consumption is scarcely justified. But when it comes to the matter of public lighting, in the streets and public squares, the theatres, cafes, restaurants, and entrances to hotels, there is probably no city in the world that can compare with the city of Paris. The public pay for the light out of doors, and enjoy it; while at the same time the more gas there is consumed the cheaper it can be made, and, consequently, the larger is the city's share in the profits.

PARIS, April 29, 1881. G. W. D.

Preserving Wood.

The improved French method of preserving wood by the application of lime is said to work well. The plan is to pile the planks in a tank, and to put over all a layer of quick-lime, which is gradually slaked with water. Timber for mines requires about a week to be thoroughly impregnated, and other wood more or less time according to its thickness.

The material acquires remarkable consistence and hardness, it is stated, on being subjected to this simple process, and the assertion is made that it will never rot.

Beechwood prepared in this way for hammers and other tools for iron works is found to acquire the hardness of oak, without parting with any of its well-known elasticity and toughness, and it also lasts longer.—*Am. Manufacturer.*

[Official Report.]

Second Annual Meeting of the Central New York Gas Engineers Association.

The second Annual Meeting of the Central New York Gas Engineers Association was held at the Osborne House, in Auburn, on Wednesday, May 18, 1881.

The meeting was called to order at 11:30 A.M., President A. C. Wood in the Chair.

Upon motion, the reading of the minutes of the last meeting was dispensed with.

The following members were present :

A. C. Wood, Syracuse; W. A. Wood, Syracuse; D. M. Dunning, Auburn; M. Harrington, Niagara Falls; F. D. Kingsbury, Corning; W. Parrish, Seneca Falls; R. J. Dobson, Waterloo; C. A. White, Rochester, with other members of the Association.

The President remarked that it gave him great pleasure to inform the members of the Association that Captain W. H. White, Secretary of the American Gas Light Association, and Mr. A. B. Slater, of the Providence Gas Light Company, were present, and that he had the honor of welcoming them to this meeting, and trusted they would fully and freely take part in the discussions.

The President then formally introduced the gentlemen to the members of the Association and, on motion of Mr. Kingsbury, the privileges of the floor and the courtesies of the Association were extended to both gentlemen.

Captain White, in responding, said that he did not deem it necessary to inflict a speech upon the Association. He had long felt a deep interest in the Association, had seen that they were upon the right road, were doing good work, and the reward of the same must surely come not alone to the members, but the results to be spread amongst the entire profession. He had hoped to have been present at several of the former meetings but had been prevented; but now I have come amongst you not alone as one of the profession, but in my official capacity as Secretary of the American Gas Light Association, and in order that all might be well-provided have brought with me a member of the Finance Committee of that Association, so, if any of you are short of funds, just pass me by and call upon him.

Mr. A. B. Slater stated that he hardly deemed that he was worthy of being a member of the Finance Committee, as he was too tender-hearted, and could not resist appeals made to him. He had even allowed some stranger on the train with him to borrow all his money, and had thrown in a couple of gold watches, fearful he might still be in need, and only felt bad because the man, who was ticketed to Syracuse, got off the car at Albany, without thanking him; still he supposed the man was so grateful that he did not wish to disturb the slumbers of his benefactor, had repressed his emotions, and left.

Had met Mr. Wood, at Syracuse, who had bound up his wounds.

It, indeed, gave him great pleasure to be with them, and permitted to take part in their meeting.

The President's Address.

The President then addressed the Association as follows :

Gentlemen of the Association :

To-day we celebrate our second anniversary. Two years ago, after having considered the subject of the formation of an association of the superintendents and engineers of this portion of the State, and after writing to several upon the subject, a meeting was called for organization; that meeting was held in Syracuse, there being eleven representatives of the forty-eight companies in the district present. To-day we meet with a representative membership of at least one-half of those companies.

I do not flatter you when I say that much good has already resulted from our meetings. Many valuable papers have been presented, and the discussions that have followed have winnowed, as it were, the wheat from the chaff; and there is not one of us but is to-day the wiser, more proficient practically, and better fitted to conduct his business than he was before the organization of the Association.

Through the medium of the American Gas Light Journal, the official organ of the Association, these papers and discussions have gone to the companies all over the country; and some of them have borne fruit in that they have brought out papers on the same subjects before the American Gas Light Association. May we hope that, like the scriptural bread cast upon many waters, that it shall return to us after many days in increase of knowledge and usefulness.

Our last semi-annual meeting was held at Bradford, Pennsylvania, upon invitation of the Bradford (Natural) Gas Company, of which our honored Vice-President is President, and Messrs. Avery and Hequemburg, both members of the Association, are his associates.

I regret that so few of you found it convenient to be present at that meeting for we were received and entertained right royally; it was, in truth, a red letter day to all who were present. We were shown the wonders of that city of 7,000 inhabitants, built, as it were, in a day; its vast resources and surroundings; its oil and gas wells; its pipe lines and oil tanks; its narrow-gauge railroads, etc., etc., a full description of which would occupy too much time and prove a task I deem myself unable to perform.

We found Messrs. McDougall, Avery and Hequemburg busily engaged in laying a line of pipe for an additional supply of gas from wells they had sunk some nine miles from Bradford, this line of pipe was laid in a bee-line directly across the country, over the hills and through the valleys, across streams, regardless of obstructions, deviating for nothing except oil wells, which they could not pull up, or buildings that could not well be removed. It was an exhibit of pluck and energy seldom witnessed, and is entitled to large returns on the investment, which, no doubt, will be realized. I make mention of our Bradford meeting at this time as so few were present, and from the fact that our Secretary was unavoidably absent, and the minutes of the meeting, together with a description of our trip, and what we saw and did, failed to reach him, and, in consequence, was not published as was intended.

Since our last meeting the meetings of the American Gas Light Association and the New England Association have been held the proceedings of which have been published in the American Gas Light Journal. Many valuable papers were read and discussed at these meetings, and I would earnestly advise you to give them a careful perusal, if you have not already done so, for you will find them of interest, and instructive.

This being our Annual Meeting, the election of officers for the ensuing year is to be held. Having been honored with the position of presiding officer since our organization, and believing that rotation in office is productive of good, a re-election I most respectfully decline, thanking you kindly for past favors.

Treasurer's Report.

The Secretary and Treasurer then presented the following report :

To the President and Members of the Central New York Gas Engineers Association :

Gentlemen—The following is an exhibit of receipts and expenditures to date—

Receipts.

For Membership Fees	$63.00
" Dues, 1879–80	24.00
Total receipts	$87.00

Expenditures.

As per Vouchers	$62.50
Balance on hand	$24.50
There remain unpaid of dues assessed for year 1879–80	$16.00

I would, therefore suggest that no dues be assessed on the members for the year 1880–81.

Respectfully submitted,

Clement A. White,
Secy. and Treas.

On motion, the report of the Secretary and Treasurer was received and placed on file.

On motion of Mr. F. D. Kingsbury, the suggestion of the Secretary and Treasurer, that no dues be assessed for the year 1880–81, was adopted.

Mr. D. M. Dunning proposed the name of Mr. D. Harrington, of the Auburn Gas Light Company, for membership.

Unanimous consent having been obtained, the Secretary was, on motion, ordered to cast the ballot of the Association in favor of the election of Mr. Harrington.

The President announced the result, and declared Mr. Harrington, entitled to all the privileges of the Association.

On motion, the following gentlemen were appointed by the President as a committee to nominate officers for the ensuing year: Messrs. Dunning, Kingsbury and Parrish.

The committee presented the following names :

President—A. C. Wood, Syracuse.
First Vice-President—J. McDougall, Hornellsville.
Second " —W. Cartwright, Oswego.
Secretary and Treasurer—C. A. White, Rochester.
Executive Committee—D. M. Dunning, Auburn; F. D. Kingsbury, Corning; Wm. Humphrey, Danville; W. Parrish, Seneca Falls; M. Harrington, Niagara Falls.

Unanimous consent having been obtained, the Secretary was, on motion, directed to cast the ballot of the Association in favor of the election of the gentlemen named.

Messrs. M. Harrington and W. A. Wood were appointed tellers, and announced the unanimous vote of the Association in favor of the gentlemen named.

On motion, the meeting adjourned to meet again at 2 P.M.

[To be continued.]

[Translated for the AMERICAN GAS LIGHT JOURNAL.]

The Burning of the Theater at Nice and the Magasins du Printemps at Paris.

The cause of the disaster at Nice was at first, and most positively, charged to an explosion of illuminating gas. It now appears, after a careful investigation, that the origin of the fire is to be attributed to the careless handling of a torch in the *lighting* of a gas jet. A similar cause led to a similar effect (although, happily, unattended with such a loss to human life) in the destruction of a large store and warehouse—the Magasins du Printemps—in the city of Paris, France.

We give the following account concerning these matters, which is taken from the *Journal des Usines a Gaz*, of April 5th :

The horrible catastrophe of the burning of the theater of Nice was attributed, at first, like that of the stores of the Printemps here, to an explosion of gas. It is of great importance to our business that the real facts be made known, for neither the one nor the other of these fires is due to an explosion.

At the Printemps it is proven that it was the lamp-lighter who brought his lighted torch too near some inflammable goods, which took fire. The wonder is that such accidents are not of more frequent occurrence, when we bear in mind that the custom is each evening to light the jets in the show-windows, in which are hung, sometimes even on the gas-fixtures, laces, curtains, and other light fabrics in this careless manner. The clerk, more or less skillful, introduces his torch, in which is burning spirits-of-wine, amongst these stuffs, in order to reach the jet, the flame of which he regulates by striking the key with the torch itself.

A despatch from the prefect of the Maritime-Alps, at Nice, to the *Figaro*, thus rectifies the account of the destruction of the theater at that place ; we copy from this *Journal* the following—

"The director of the theater and the artists who were on the stage at the fatal moment declare that the fire was communicated to the scenes in lighting the jets, and without any explosion of gas having occurred."

It is evident that the simplest precautions are not taken in theaters to avoid conflagrations, the consequences of which must always be disastrous in such public places where the exits are much too narrow. The materials, the decorations, and woodwork ought to be impregnated with certain salts which would render them not only incombustible but also uninflammable. There are a number of very excellent processes of this kind : but directors, generally, draw back at the expense, as if the final result was not a thousand times more costly. It has become an axiom with the public that every theater must end in a conflagration. This is perfectly true if the authorities will not compel our directors to take at least the simplest precautions to guard against fire.

Another cause of the catastrophe at Nice was the extinction of the gas in the house and passageways, which was designedly done, to avoid the escape of gas from the lead pipes melted by the fire from the woodwork. But it would have been much better, as is to be found in all well-regulated theaters, to have had *un jeu d'orgue*, that is to say, a series of cut-offs by means of which any portion of the gas main could be isolated from the rest of the house without being obliged to envelope the whole in total darkness. It would have been prudent to have had in the passageways, along with the gas, a certain number of oil lamps, thus giving a means to the public of finding its way out of the building in the event of the gas being extinguished.

Let us hope that these successive fires will teach the authorities a lesson to be more exacting in their requirements that the safety of the public be looked after. The people pay to be amused and not roasted.

These reflections are not altogether superfluous, for already the electricians have profited by this circumstance to recommend that theatres be illuminated with the electric light. We find the following editorial announcement in *la France :*

"*Illuminating Theaters with the Electric Light.*—The shocking conflagration of the theater of Nice—which was occasioned, as everybody knows, by an explosion of gas—serves to show boldly the great progress made in a short time in lighting by electricity. The greater number of fires is occasioned by accidents of this kind, or by circumstances dependent upon the process of lighting by gas, such as leakages, breakages of pipes, ignition, etc. With the electric light all possibilities of conflagration are removed, while the elegance, the beauty and the economy of the light does not suffer in the least.

"But the question is asked, is it possible to light an entire theater, for example, with the electric light? Yes, we reply, the problem is soon to be brilliantly solved. Wednesday next, March 30, at 9 P.M., one of the electric companies which has lately petitioned the municipal council to light the city of Paris with electricity, will give most convincing experiments of their entire ability to do this. The experiments will be held at the old Atheneum, 17, rue des Martyrs. We warmly invite the directors of theatres, concert-halls, etc., the directors of large establishments, the proprietors of stores and factories in Paris to be present. An entire theater—stage, foot lights, scenes, lobbies, passageways, etc.—will be lighted with electricity, and an account may be made, as much from the point of security as of economy, and also, of the beauty of the light, of how much superior this mode of illumination is to the old manner of lighting with gas."

We assisted at these experiments, and shall give an account of them with our usual independence. Let us say first-off that we had not as yet seen an induction of electric lighting as satisfactory for a public place ; this we attribute to the reasonable intensity of the centers employed, and to the regularity of their flame, whilst even to this day electricians have accustomed us to be almost blinded with it.

The illumination of the little hall of the Atheneum was made by 30 centers, of which 12 were in the roof, 12 in the galleries, 4 at the foot lights, and two brackets. There were, besides, 16 of the weakest centers in the adjoining room and the machine room, one in the comptroller's office, one in the director's room—in all 48 centers. These were Werdemann lamps, perfected by Napoli, that is to say, incandescent lamps, or, more properly speaking, lamps consisting of an infinitely small voltaic arc.

The body of the house was rather too brilliantly lighted, and, in revenge, the stage was not sufficiently lighted ; we could see, however, that only a simple modification of the apparatus was necessary in the distribution to remedy this. The lamps are steady and silent. The machine was stopped several times to show that the relighting could be done automatically, by putting the machine in operation, and the experiment succeeded admirably.

Now that we have done justice to that which was satisfactory to us, we can truly say that we place but little credence in the amount indicated for the force absorbed by each lamp, which could satisfactorily give a light of 18 or 20 candles. This amount was fixed at ½-horse power per lamp, but we incline strongly to the belief that it was double this amount.

The illumination was performed by three direct-acting Gramme machines and one reciprocating machine, driven by a steam engine and boiler of the nominal force of 50 horses, but easily being made a 60-horse power. Just here we may be permitted to remark that, seriously, we cannot say illumination by electricity is less dangerous than by gas, when we remember that a steam engine and boiler of this importance is placed at the side of an auditorium.

We will add still further that this illumination does not permit of any of the variations of strength that is required on the stage of a theatre, and experiments which have been made demonstrate to us that the use of night lamps of this kind is not practicable. The possibilities of extinction are much greater than with gas, for it is only necessary for the belt of the machine to fall to leave the whole house in darkness.

To sum the whole matter up, we repeat that the experiment at which we were present was very interesting, but that it does not occasion us any anxiety about the use of gas in theaters ; and we think that the chances for accidents are at least equal, if not greater, with electricity than with gas.

We are pleased to see that our *ediles** agree with our ideas in regard to the measures to be taken for the public security in theaters and meeting places, and we reproduce the text of the propositions which have been presented to the municipal council, with the hope that this is not a sudden flash, and that these good intentions will last longer than the excitement which has caused them.

Proposition No. 1.

Whereas, The catastrophe that has just fallen upon the population of Nice is a proof of how incomplete is the system of rendering the aid which ought to be had in the auditoriums of theaters or large meeting places ;

Whereas, Paris is every day exposed to witness similar catastrophes ;

Whereas, One of the greatest duties incumbent upon the municipal council is to watch over and to provide for the security of the inhabitants of the city of Paris ;

The council requests the department of the Prefecture of the Seine and of the Police to take, without delay, all necessary steps to assure the complete security of all assemblages of people in play-houses, concert halls, etc.

Signed, MARSOULAN, DARLOT.

Proposition No. 2.

Whereas, It is recognized by all that the offices of various functionaries of the municipal council present serious dangers in case of fire, as it is certain that temporary structures made in great part of spruce, dried in a relatively high and permanent temperature, would be enveloped in flames before even the slightest assistance could be afforded ;

Whereas, It devolves upon the municipal council to take every means to

*Ædile or *Edile*, a public official in France whose duties are to superintend public markets, theatres, etc., and corresponds to our superintendent of public works.

lessen the dangers resulting from that situation imposed by the necessity of a hasty transfer from the Luxembourg to the Tuileries, the council determines that the wood work, doors, floors, tapestries of apartments occupied by municipal functionaries at the Palace or in the court of the Tuileries be covered with an incombustible coat, and that this be done with as little delay as possible. The officer in charge of the department is directed to furnish an estimate of the expense necessary to do the work, in order that the Council may vote a corresponding credit.

Signed, DELATTRE.

We give below several extracts from the Nice *Patriot*, which establishes, in the most peremptory manner, the fact that the catastrophe that occurred at the Municipal Theater at Nice was not caused by an explosion of gas. First, we give the letter addressed to the *Petit Nicois*, by M. Bolognini, the director of the burned theater :

NICE, March 25, 1881.

Editor of the *Petit Nicois:*

You publish in this morning's number the following : "Yesterday, Thursday, M. Bolognini, the director of the Municipal Theater, on being questioned by the Judge, had, it would appear, replied that all day Wednesday so strong an odor of gas permeated the house, that it was resolved not to have any performance that evening, so as not to bring the public into so tainted an atmosphere. It was finally determined, however, to reconsider this resolution. An order would have been sent him to play even if this had not been done."

Not knowing your motive in advancing the facts contained in these lines, I find myself compelled to send you a complete denial of the whole article in the interests of truth ; and, especially, not to permit any suspicions to rest upon people who, in no respect, are responsible for the calamity which has befallen the city of Nice.

Mr. Editor, I have never been questioned by the Examining Magistrate, I have never made him the answer that you attribute to me—*no odor of gas at any time permeated the auditorium of the theater*, and, further, I had not the slightest intention of omitting the play that evening, and, finally, I did not receive an order to reconsider a resolution that I had not taken.

Therefore, sir, all the facts that you have so gratuitously advanced without having obtained information from me, which you could so easily have done, are entirely false.

I leave to the public, the sole judge in this matter, the task of finding out why you used my name, and my interference in so important a matter, and which is so utterly false.

Yours truly,

ERCOLE BOLOGNINI.

The following declaration is even stronger than that of M. Bolognini :

NICE, March 27, 1881.

The undersigned, who were present at the lamentable scene which has recently occurred at the Municipal Theater, declare that *there was no explosion of gas*, that the fire originated at the back of the stage at the angle to the right of the audience, that it lasted during several minutes without making much headway, that they were able to leave, that it was only afterward that *the gas was* extinguished or had been extinguished.

They declare, in the most formal manner, that there was neither in the house nor on the stage any odor of gas, and that the curtain was down.

Vicini Eugenio, 1st Tenor; H. Leonida ; E. Mendola ; Renigio Bruni ; Bracale Raffaele ; Azioli Giuseppe ; Antoine Trapani ; Valero Francesco ; Chiavina Vicini.

[Correspondence London "Journal of Gas Lighting," April 26.]

The Use of Gas for Cooking and Heating.

A great amount of interest has been excited throughout the West of Scotland in the use of gas for cooking and heating during the last year or two, in consequence, in a large measure, of the prominence given to the subject by the gas apparatus exhibitions that have been held within this time in Greenock, Paisley, and Glasgow ; and as I have been favored with a number of interesting and valuable notes dealing with the subject, generally and specially, from several gas managers and other experts, I put them into the form of a communication for the *Journal*, in the hope that they may be of some use to such persons in other parts of the country, and more especially in Scotland.

The Greenock exhibition was really the first thing of the sort of any importance north of the Tweed, and therefore my historical data may appropriately begin with it. This show certainly created a great degree of enthusiasm in favor of gas stoves ; but owing to various causes it did not continue. Notwithstanding this fact, however, there has since been a steady and increasing demand in this town for gas cooking stoves of various kinds, and for gas heaters ; and from recent inquiries that have been instituted it is confidently stated that there is a considerable number of such appliances distributed all over the town, and the demand is continually widening. But there is no want of complaint, a number of the persons who have bought them not being satisfied with their acquisitions ; and, so far as can be ascertained, the dissatisfaction is due to one or more of the following causes.

First, many persons have bought cooking-stoves too large for their every-day wants, and consequently find that the consumption of gas is larger than was anticipated. The result is they only use them when they have large cooking operations to perform, and in this way they lose the advantages and conveniences due to every-day use.

Secondly, there are complaints as to the quantity of gas used, in consequence of the carelessness of servants, especially in the use of the "ring" burners, which always consume a larger quantity of gas in proportion to the work done, than the burners inside the baking and roasting chambers, which are usually on the Bunsen principle, while the others are not always so. The waste of gas arises from the ring burners not being turned off or turned down immediately they are done with, as should be the case, even though the cooking utensil is only removed for a temporary purpose ; for, as the burner gives off the maximum amount of heat from the moment the gas is lighted, there is no necessity for keeping it going up to its full power in order to maintain the heat, as in the case of an ordinary coal fire. Again, many servants have the habit of running to the gas-stove for every simple purpose while they have a coal fire at hand suitable for all they require, at the time, and burning to waste.

Thirdly, persons often complain of the cost of gas as compared with that of coal, from the results, it may be, of only a few experimental tests. If, instead of doing so, they were to make a comparison of the yearly consumption of coal with the yearly increased cost for gas, the result would certainly be in favor of the gaseous fuel. Many people do not keep any comparative account of what they pay for coal, while their gas accounts are always at hand to show the expense for gas ; and, further, the time that ordinary fires are kept burning simply to be ready for the cooking operations is not noticed, while with gas this extra burning is quite unnecessary. But if the outlay for gas in a carefully managed stove be a little in excess of that for coals, the cleanliness, comfort and convenience of the gas stove, with its regularity of heating, as compared with coal fires, should more than counterbalance any excess of cost for gas.

Fourthly, complaints frequently arise from want of pressure, in consequence of the stove being placed in a part of the house where the supply pipes are small, and where, in many cases, they are already too small for the satisfactory supply for illuminating purposes only. Thus, when the stove is put on there is an inefficient supply—for it is not only the quantity of gas which the stove consumes that has to be taken into consideration, but also the necessity which exists for an efficient pressure of gas so as fully to develop the gas flames and at once to put them up to their full power. If this is not done, there will not be sufficient heat for cooking the food properly. It is scarcely necessary to refer to the deficiency of gas supply from the ignorance and stupidity displayed by gas fitters, in fitting up gas stoves by connecting them with pipes altogether too small, even where there is an efficient supply. Where the gas supply of houses is controlled by a regulator placed on the meter, there is almost certain to be a deficient supply to the gas stove. The only certain plan of avoiding complaint and ensuring an efficient gas supply is to have a separate service and meter for the gas stove ; and while dealing with this point, I may remark that Mr. Stewart, of Greenock, informs me that the Corporation Gas Committee for that town are quite willing, in such cases, to supply the extra meter, and put in free that portion of the service which extends from the street main to the tenement, providing the person wishing it will put in the other portion of the service. In this way a pipe of any required size would be obtained. The experience gained in Glasgow would seem to show that only in very rare cases has such additional service pipe been required for gas stoves, but it is always strongly recommended by the Gas Corporation servants that the connection for the supply of gas stoves be made upon the main pipe leading from the meter. A pressure of one inch ought, as a rule, to be quite sufficient for any gas stove, although in Mr. Stewart's experience there is one case where even this amount of pressure is not sufficient. I am informed that the maximum pressure allowed in England rarely exceeds 7-10ths of an inch—the minimum pressure allowed during the daytime in Greenock throughout the low parts of the town, round by the Harbors, etc.; and as much of the town rises rapidly above the lower levels, there is always far more than sufficient pressure in the street mains : indeed, in many parts of the town, the pressure is so much in excess as to be a cause of occasional complaint.

Unfortunately, those gas consumers in Greenock who have cause of complaint from deficient supply to their gas stoves do not lodge their complaints at the Gas Office, where there is a staff of skilled workmen kept for the purpose of giving assistance or advice, and which would be willingly rendered ; instead, they simply give up using the stoves in disgust, and tell their friends how useless they are.

Fifthly, many persons complain of the smell arising from the use of gas stoves, more especially the ovens. This undoubtedly arises in many cases from an inefficient supply of air to the burners. When there is a want of air to the burners in the oven the smell is often perceived, but may easily be got rid of by drawing out a little tray under the oven, so as to let more air in. This will also prevent the gas flames in the oven from being extinguished when the door is quickly opened or somewhat violently closed. In Scotland generally the gas is so well purified—lime only, as a rule, being used—that no offensive smell should arise on account of the gas being impure. But there is another cause of smell when the stove is first lighted; I allude to that due to the accumulation of choke damp and certain products of the imperfect combustion of the gas, and which collect in the small flue leading from the oven of the gas stove, more especially where the stove is exposed to damp, or the flue has several more or less abrupt turns in it. This circumstance was very frequently noticed in the case of one of the gas cooking stoves shown at the recent exhibition in Glasgow, the moist gases driven out of the flues after the stove was first lighted up being peculiarly pungent and disagreeable. Of course, all gas stoves should have flues leading away to a chimney or otherwise to the external air, more especially those constructed to work on the principle of the Bunsen burner. Those stoves burning with a white flame do not seem to need a flue so much as the others.

The following are the chief points that should be noticed in choosing a gas stove:

First, it should heat readily and retain the heat steadily from 250° to 400° Fahr. Those lined with reflector tiles often take a long time to heat, and are thus a cause of disappointment to persons who commence to use the stove as soon as the gas is lighted, as they see their friends do who have stoves not so constructed.

Secondly, the stove should not radiate heat from its sides, so as to heat the apartment and incommode those using the stove.

Thirdly, it should raise the required heat and retain it with a minimum expenditure of gas.

Fourthly, all the parts of the stove should be readily got at, so that it may be kept clean throughout—inside and outside flues, shelves, etc. For this purpose the top plate covering the ring burners should be removable, unless the part underneath this plate can be got at easily from the front of the stove, as in some cases where there is a tray passing below the ring burners.

Fifthly, all stopcocks, their keys, pipes, etc., should be of a substantial character, and, if possible, "bright," thereby giving a neater and more cleanly appearance to the stove.

Sixthly, the price should be noted as compared with similar-sized stoves.

Generally speaking, it may be stated that that stove is the best which, with a low first cost, consumes the least gas to do similar work in quantity and quality as compared with that done by other stoves; has most conveniences for general purposes; is well and substantially gotten up; does not throw out much heat from its sides, flue or otherwise; is so devised as not to contaminate the food cooked, by providing that there shall be little or no chance or possibility of the gases resulting from the process of combustion reaching the food while being cooked; and, lastly, is easily fitted up into the position it is to occupy when in use.

For a considerable time the difficulties attending the introduction of gas stoves into Scotland were of a twofold character. They were not devised for the use of Scotch cannel gas, which is generally so rich in hydrocarbons as to have nearly twice the illuminating power of much of the gas supplied in English towns; and they were deficient in their fitness to compete economically with coal fires. Many of the stoves that people in Greenock and other towns first used were rejected from their unserviceableness in actual work; but in most cases they were of English manufacture, and constructed for working with gas of low illuminating power. Even cooks and *restaurateurs* on a large scale, who were quite satisfied that immense advantages might result from the use of gas in cooking, had to "hold their hand" until the various difficulties they had to contend with were surmounted.

Some of the English makers who put in an appearance at the recent exhibition of gas apparatus at Glasgow professed that they had succeeded in making cooking stoves suitable for burning Scotch gas, and in consequence many of their articles have now come into use. One local firm, however, who took up an agency for stoves, have been induced to give up, and have disposed of their stock "at a sacrifice." But the manufacture of cooking and heating stoves adapted to the quality of Scotch gas has now been taken up in Glasgow with great energy, and in a most enterprising manner; and the impetus given to it by the exhibition of last autumn is something extraordinary. The study and experience of many years have at last resulted in the production of stoves not only adapted to burn Scotch gas most perfectly, but displaying also a complete revolution in style, finish, and beauty of construction not formerly associated with gas stoves. I learn from one person—himself a large *restaurateur*—that, although he was long ago convinced that there was nothing to compare with gas for cooking and heating purposes, he discontinued its use for a considerable time as an agent for heating ovens, until he discovered that the great secret of success lay in the proper kind of burner. The rest was an easy task. From time to time improvements suggested themselves in construction, substantiality, and form; and he has now acquired such an amount of experience that he is ready to undertake to build an oven anywhere, in the most complete confidence of success resulting to the builder, and comfort, cleanliness, and ease being experienced by the user.

Gas managers in Scotland—as also the directors of gas companies and gas corporation committees—are becoming alive to the benefits of the extended use of gas for cooking and heating. This is especially true of Mr. J. M'Gilchrist, the able and energetic gas manager at Dumbarton. Owing to his practical knowledge and skill, combined with the fact that there was in the market gas cookers and gas heaters in which he had every confidence, he has been enabled to do valuable service to the gas consumers of that town and in various parts of the county. He has, in the first place, been the means of greatly increasing the day consumption of gas; he has largely benefited many families, and has actively encouraged a very important branch of the iron manufacture. It is probable that in no part of Scotland has the use of gas for cooking and heating—relatively to the extent of the population—made more progress than in Dumbarton; and I understand that before long Mr. M'Gilchrist will lay before the gas world some specific data bearing upon the matter, which will be of an interesting character. Meanwhile, I may mention one or two facts placed at my service by a practical cook. One is a very important feature which is not likely to be known, he says, to gas managers generally, and is considered far less by the general public—namely, that besides the greater comfort in the kitchen (and those only who have experienced being broiled over large fires can appreciate this when much cooking is going on), there is the fact that in cooking joints by gas, not only is the gas paid for in its product or work done, but the saving in weight effected is so great that where there is a large quantity of cooking the oven itself is soon paid for. The shrinkage of the meat is, he remarks, much less, and the flavor is greatly improved through the juices being preserved with gas cooking. For my special benefit he made, a few days ago, a very careful comparative test of roasting in a coal-fired oven and a gas oven. Two joints of 16 pounds each were taken, as nearly as possible alike, and the following is the result:

	Coal Fire.	Gas Fire.
Weight put in.....	16 lbs.	16 lbs.
Weight taken out.....	11 "	13 "
Loss.....	5 lbs.	3 lbs.

These are very striking figures, but they are only a confirmation of previous tests.

Stoves used for warming apartments are getting into extensive use as well as cooking stoves. When heated by white lights they do not prove more hurtful than ordinary gas burning simply to light a room. In many cases they are arranged to warm the air of the apartment without mixing with it, the resulting gases being carried off by a flue. In consequence they do not give off offensive gases, as is the case with many cookers.

That there is a greatly extending use of gas stoves is proved abundantly by the fact that the day consumption is showing a marked increase both in Greenock and Glasgow, and this should be actively encouraged by all gas managers.

Very shortly, I expect, there will be issued two very elaborate and valuable reports from the Glasgow Exhibition Jurors on the two classes of Gas Cooking and Gas Heating Appliances, in which gas managers, stove manufacturers, and other persons will find much food for thought; from which fact, and various others more or less enlarged on in the foregoing remarks, it may be confidently affirmed that the exhibition in question was held to some good purpose.

Corrosion of Lead Pipes by Lime-Mortar and Cement.

The observation has lately been specially brought to public notice by the publication of an article by Dr. Rossel, a German savant, that lead pipe, when placed for any length of time in contact with lime-mortar or cement (which contains free lime), always undergoes a decided change, becoming converted more or less perfectly into basic carbonate of lead. Other substances, this observer states, have a somewhat corrosive action upon this metal, lead pipes in moist soil impregnated with chlorides or saltpeter being invariably attacked, but to nothing like the extent that they suffer in contact with lime. On the other hand, neither the sulphates, like plaster of Paris, have any effect on the metal; nor have the carbonates (like chalk or limestone), the silicates, clay or sand.

As illustrating the activity of the chemical action of free lime upon lead, Dr. Rossel estimates that under favorable circumstances, a pipe one twenty-

fifth of an inch in thickness, may be entirely eaten through in 15 or 16 months. From his observations he makes the following statement :

1. Lead pipes should never be brought in contact with any sort of mortar or cement.

2. Clay does not attack lead pipe if free from sal ammoniac and saltpeter, the latter resulting from the decay of organic matter.

3. Plaster of Paris offers the best protection for lead pipes. Wherever lead pipes pass through a wall, they should be laid in gypsum, over which mortar or cement can then be safely laid.

The foregoing facts and conclusions are worthy of careful attention by builders, plumbers and others, in view of the common use of lead pipes for distributing water to and from our dwelling houses. So far as we are aware no precautions are at present taken to avoid contact of such pipes with fresh lime mortar; on the contrary, the common practice, we believe, is to plaster up the recesses and holes made by the passage of lead pipes, with lime mortar. Nor are we aware that serious results from corrosion of such lead pipes have ever been brought to light.

It is safe, we think, under the circumstances, that something more than the mere presence and contact of lime is demanded to account for the facts stated by Dr. Rossel, of the correctness of which we entertain no doubts. This something, most probably is moisture. The most striking effects of corrosion, Dr. Rossel notes as having occurred in the case of lead pipes buried in moist earth in contact with lime. The rapid change of the metal under such circumstances would appear to be best explained on the supposition that the constant advent of fresh supplies of moisture percolating through the soil, charged with minute quantities of carbonic acid gas and atmospheric oxygen in solution, would cause the gradual conversion of the free lime to the condition of carbonate, and that this change, taking place in immediate contact with the lead, would induce a similar change in it—first, conversion to oxide by union with the dissolved oxygen in the soil water, and finally to carbonate.

In dry situations, there seems to be nothing to warrant the assumption that contact of free lime with lead will produce any notable corrosive action; and while Dr. Rossel's third conclusion is doubtless a safe rule to follow, we believe that the experience of architects, builders, plumbers and others familiar with the subject in its practical bearings, will bear us out in the opinion that his first conclusion is altogether too sweeping. If any of our readers have any facts bearing on these points, we would be pleased to receive communications from them, as the subject is one of much practical interest.—*Manf. and Builder.*

A Remarkable Corporation.

A certificate of organization of the "Gas Light Transportation Company' was yesterday filed in the office of the Secretary of State. The incorporators are Hugh J. Hastings, the proprietor of the New York *Commercial Advertiser;* John Hoey, whose magnificent summer resort is one of the wonders of Long Branch; United States Senator J. R. McPherson, of this State; J. Nelson Tappan, Isaiah C. Babcock, Frederick A. Gilbert, John C. Lucas, Henry D. Moore, and John W. Baker.

These gentlemen organize the company under the corporations act of this State, "for the purpose of the transportation of illuminating gas by pipes or otherwise from various points in Pennsylvania and elsewhere, to various points in New York, New Jersey, Pennsylvania, Maryland and elsewhere, and the storage of gas and the supply and sale of gas to gas companies and other corporations and persons." The business is to be conducted in Jersey City, Newark, Elizabeth, New Brunswick, Trenton, Camden and other cities and towns in New Jersey, and in New York city, Brooklyn, Philadelphia, Baltimore, Washington, etc.

The capital stock is fixed at twenty five millions of dollars, divided into two hundred and fifty thousand shares, at a par value of $100 each. The company may commence business on $27,000, which is represented by two hundred and seventy shares of stock, held in equal instalments by the above mentioned nine incorporators. The probable object of the company is to utilize natural gas formed in some of the Pennsylvania oil regions.—New Jersey *State Gazette,* May 25.

Extinction of the Brush Lights in London.

One night this month, some time between eleven and twelve o'clock, that part of London which extends from Blackfriars Bridge up Ludgate Hill to St. Paul's Church-yard and down Cheapside to King and Queen streets was suddenly in utter darkness. This was the area illuminated by the electric lights on the Brush system. Something had gone amiss, but exactly what it was those in charge of the electrical apparatus could not discover. Finally the ancient gas connections, which had not been disturbed, were brought once more into use.

It is not at all impossible that in the first years of using any electric system of lighting that accidents of this kind will occur. It is not necessary to recur to the fact so often mentioned that so far we can only in a slight degree store up electric force, and that one of the necessities of electric lighting is that this force must be continuous. Such companies as engage in the business will, of course, take all due precautions. Plants will be doubled and even with some we understand that two distinct sets of connecting wires are to be used. But we have not yet got to the bottom facts of insulation, on which all the success of electric lighting depends. Wire sometimes acts in the most paradoxical way. A bit of copper run through one portion of a brick wall will last apparently forever, a powerful current running through it all the time, while another, not a foot from it, equally well insulated, crumbles away or gets converted into a sulphate or carbonate or oxide of copper in a short space of time.

The great impulse electric lighting must give to the use of metallic conductors will without a doubt lead scientific men to study more particularly what are the peculiar qualities of wire made of the same metals but manufactured in different ways, and the determination of their durability under various circumstances. But something this new use of electricity must look to will be to remove that unmitigated nuisance—the wires running in the air along streets and over housetops. Such method of transmitting the electric force will be found very costly when it comes to be employed for lighting.

A single fire in a street, the tumbling down of a roof from an overweight of snow, or the breaking of a telegraph pole, would plunge a whole quarter of the city in utter darkness. People can exist with an interrupted telegraphic communication, but would be apt to abandon any electric light system that did not provide against every possible accident. Wires will have to be buried in the ground. If the Atlantic cables represent the maximum of insulation, ordinary land wires, no matter how suspended, represent the minimum. So far all the trouble about electric lighting seems to be in regard to perfect insulation, and as the use of connecting wires increases every day, so does establishing at once a better method of carrying the wires become a matter of prime necessity.

The question of the immediate success of any of the present systems of electric lighting depends, then, not on the motive power or the electric generators but really on the insulation and permanency of the wires.–New York *Times,* May 27.

Cost of Water Works in Principal Cities of the United States.

The following table shows the cost of water works for water supply in various cities, the cost per capita, etc.:

Cities.	Cost of water works.	Population.	Cost per capita.
Detroit	$2,750,700	119,000	$23.11
Newark	2,671,580	140,000	19.08
Wilmington	912,120	44,000	20.73
Albany	.....	85,000	.....
Buffalo	3,000,000	164,000	18.29
Cincinnati	6,813,000	260,000	26.20
Milwaukee	2,227,482	115,702	19.25
Columbus	943,513	52,090	18.14
Louisville	3,906,141	156,000	25.04
Cleveland	2,628,319	156,000	16.84
Providence	5,530,347	104,850	52.74
Boston	18,320,000	412,000	44.46
Manchester	800,000	33,000	24.24
Hartford	1,495,519	42,000	35.00
New York	35,820,081	1,041,886	34.38
Philadelphia	18,703,519	817,500	23.00
St. Louis	.....	400,000	.....
Brooklyn	.....	485,000	.....
Chicago	8,802,825	503,304	17.49

—*Engineering News.*

Reduction in Price of Gas.

Jacob L. Kuehn, Supt. York (Pa.) Gas Light Company informs us that since the 1st of May the price of gas furnished by his company has been reduced to $2.50 per thousand, with a scale of discounts to consumers who burn upwards of 200 feet per month. Bills remaining unpaid after the 5th day of the month will be collected as heretofore. In no case will the discount be allowed on such bills, and if not paid on or before the 15th, gas will be shut off.

Special rates are made for gas stoves and engines.

LUBRICATOR.—Freeze fine olive oil, strain out the liquid portion and preserve for use.

THE AMERICAN GAS LIGHT JOURNAL AND CHEMICAL REPERTORY

A. M. CALLENDER & CO.,
PROPRIETORS.

Editor—G. WARREN DRESSER.

PUBLISHED ON THE 2ND AND 16TH OF EACH MONTH
At No. 42 Pine Street, New York.

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PHILADELPHIA—PRATT & Co., Corner 9th and Arch Streets.
England—C. W. HASTINGS, 22 Buckingham St., London, W. C.
Germany—B. WESTERMANN & Co., of New York

THURSDAY, JUNE 2, 1881.

Official Report of Examinations of Gas for three Weeks ending May 28, 1881, made at the Photometrical Room of the Department of Public Works.

Corrected Illuminating Power.

1881. May	Time of Day at which Test were made.	New York Gas-Light Co.	Manhattan Gas-Light Co.	Mutual Gas-Light Co.	Metropolitan Gas-Light Co.	Harlem Gas-Light Co.	Municipal Gas-Light Co.
		†	*	†	‡	*	†
9		27.02	21.33	29.32	26.13	20.28	32.33
10	Between	27.77	21.33	28.87	26.40	19.94	30.95
11	9.30 A.M.	28.19	21.21	27.84	26.28	20.08	30.87
12	and	28.48	20.74	28.92	26.35	20.56	31.07
13	1 P. M.	28.35	21.08	28.21	25.32	19.84	31.08
14		27.70	21.06	26.72	25.72	19.73	30.49
	Average	27.92	21.12	28.31	26.11	20.07	31.13
16		25.20	20.24	26 97	24.80	19.42	30.49
17		25.69	20.27	27.18	24 31	18.66	30.44
18		25.32	20.19	27.71	24.28	18.59	30.63
19		24.51	19.30	26.32	24.64	18.81	29.74
20		28.75	19.26	28.19	24.42	18.56	31.04
21		28.83	19.35	26.68	24.03	18.48	30.40
	Average	26.38	19.77	27 17	24.41	18.75	30.45
23		27.09	19.58	24.93	23.86	20.02	31.30
24		27.66	19.33	26.20	24.44	20 28	30.83
25		27.86	19.75	29.25	24.84	20.46	32.15
26		28.14	20.73	29.05	25.44	20.33	31.11
27		27.39	20.18	28 63	25.35	20.02	31.36
28		27.64	19.37	27.87	25.04	19.71	30.76
	Average	27.63	19.83	27.65	24.82	20.13	31.25

* Five foot lava tip with check.
† Bray's slit union, No. 7.
‡ Bray's slit union, No. 6.

E. G. LOVE, Gas Examiner.

Dust, Fogs, and Clouds.

Mr. John Aitken, is a paper presented to the Royal Society of Edinburgh, maintains the theory that dust is essential for the formation of fogs and clouds. Steam was mixed with air in two large glass receivers; one of these receivers was filled with common air, the other with air which had been carefully passed through cotton-wool, so that all dust might be removed. In the one receiver the air presented the usual cloudy appearance on the entrance of steam, while in the other no cloudiness was apparent, the air remaining supersaturated and perfectly transparent. In another experiment water was placed beneath a receiver and the temperature of the inclosed air lowered by reducing its tension. With unfiltered air the receiver was immediately filled with a dense vapor; with filtered air, however, no cloudiness was perceived. It was concluded from these experiments—

1. Whenever water vapor condenses in the atmosphere it always does so on some solid nucleus.

2. That dust particles in the air form the nuclei on which the vapor condenses.

3. That if there was no dust there would be no fogs, no clouds, no mists, and propably no rain, and that the supersaturated air would convert every object on the surface of the earth into a condenser on which it would deposit.

4. Our breath, when it becomes visible on a cold morning, and every puff of steam, shows the impure and dusty condition of the atmosphere.

Among the sources of atmospheric dust is the spray of the ocean. By simply heating a piece of metal—the one-hundredth of a grain of iron wire—the dust driven off will give a cloudiness in the experimental receiver. Common salt burned in an alcohol lamp gave an intense fog, and burned sulphur gave a fog so intense that it was impossible to see through a thickness of 5 cm. of it. It is calculated that more than 200 tons of sulphur are burned with the coal every winter's day in London, and this quantity is sufficient, in the writer's opinion, to account for London fogs.—*Nature.*

Gain in Weight by Combustion.

The gain in weight by combustion can be very prettily shown by the following method, which also affords a very good lecture experiment. A handful of fine zinc turnings is placed on the scale pan of a common balance, which should then be brought into equilibrium by placing weights on the other scale pan. Now apply a spirit lamp or Bunsen burner to the zinc, which, in its state of fine division, will readily inflame. As it is slowly converted to a cohesive mass of oxide, the scale pan will decend, showing that in burning it has gained in weight.

Gas Stocks.

Quotations by G. W. Close Jr., Broker and Dealer in Gas Stocks.
(with W B Scott & Co.,)
34 PINE STREET, NEW YORK CITY.
JUNE 2, 1881.

☞ All communications will receive particular attention
☞ The following quotations are based on the par value of $100 per share. ☜

	Capital.	Par.	Bid.	Asked
Gas Co's of N. Y. City.				
Central	$466,000	50	60	65
Harlem	1,800,000	50	75	80
" Bonds	170,000			103
Manhattan	4,000,000	50	177	180
Metropolitan	2,500,000	100	135	140
" Scrip	1,000,000	..	102	103x
Mutual	5,000,000	100	60	65
" Bonds, go'd.	900,000	1000	100	104
Municipal	1,500,000	100	160	165
" Bonds	750,000		106	110
New York	4,000,000	100	93	95
Northern	270,000	50	—	100
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	114	118
Citizens	1,200,000	20	45	50
" S. F. Bonds.	320,000	1000	100	105
Fulton Municipal	1,500,000	100	60	65
Peoples	1,000,000	10	35	40
" Bonds	290,000	.	101	104
" "	250,000	...	70	75
Metropolitan	1,000,000	100	60	65
Nassau	1,000,000	25	55	60
" Ctfs.	700,000	1000	95	100
Williamsburgh	1,000,000	50	60	65
" Bonds		...	98	103
Kings Co	135,000	100	55	60
" Bonds	40,000	—	—	—
Richmond Co., S. I.	300,000	...	70	75
Out of Town Gas Companies.				
Buffalo Mutual, N.Y	750,000	100	72	76
" Bonds	200,000	1000	95	100
Citizens, Newark	918,000	50	85	90
" " Bds.	124,000	—	105	10
Chicago Gas Co., Ills			125	—
Cincinnati G. & C. Co.			178	180
Consolidated, Balt.			66	67
Bonds			107	—
East Boston, Mass.		25	114	120
Hannibal, Mo	100,000	100	95	100
Hartford, Conn	700,000	25	140	144
Halifax N. S	400,000	40	148	150
Hamilton, Ontario	150.000	40	117½	
Jersey City	750,000	20	140	150
Jacksonville, Ill	120,000	50	100	...
Lewistown Maine	400,000	100	—	100
Laclede St Louis Mo.	1,200,000	100	108	110
Montreal, Canada	2,000,000	100	153	154
New Haven, Conn		25	132	—
Oakland, Cal			30	31
Peoples, Jersey City		...	95	100
" " Bds.				5
Pittsfield, Mass			120	130
Rochester, N. Y		50	70	80
" Citizens		100	30	35
Woonsocket, R. I.	150,000	100	80	...
Wilmington, Del.		50	174	...
Yonkers		50	30	32
Rondout & Kingston			75	80
St. Louis Missouri	600 000	50	250	254
San Francisco Gas-Co., S. Fr'isco Cal.			72	73
Toledo, Ohio			95	97
Troy, Citizens	600,000	100	—	—
Washington, D. C	1,500,000	20	190	200
" Scrip	500,000	20	150	160

200 shares of Manhattan sold at auction at 177½.

Advertisers Index.

Page

GAS ENGINEERS.

William Farmer, New York City ... 262
G. Warren Dresser, New York City ... 257

GAS WORKS APPARATUS AND CONSTRUCTION.

Herring & Floyd, New York City ... 259
T. F. Rowland, Greenpoint, L. I ... 259
Deily & Fowler, Phila., Pa ... 259
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 259
Stacey Mfg. Co., Cincinnati, Ohio ... 259
Bartlett, Hayward & Co., Baltimore, Md ... 259
P. Munzinger, Phila., Pa ... 259
Brown & Owen, Phila., Pa ... 259
Morris, Tasker & Co., Limited, Phila., Pa ... 259

GAS AND WATER PIPES.

A. H. McNeal, Burlington, N. J ... 258
Gloucester Iron Works, Phila., Pa ... 258
R. A. Brick, New York City ... 258
James Marshall & Co., Pittsburgh, Pa ... 258
R. D. Wood & Co., Phila., Pa ... 258
Warren Foundry and Machine Co., Phillipsburgh, N. J ... 258
Mellert Foundry and Machine Co., Reading, Pa ... 258

WASHERS AND SCRUBBERS.

G. Shepard Page, New York City ... 254

RETORTS AND FIRE BRICK.

J. H. Gautier & Co., Jersey City, N. J ... 256
B. Kreischer & Sons, New York City ... 256
Adam Weber, New York City ... 256
Laclede Fire Brick Works, St. Louis, Mo ... 256
Brooklyn Retort and Fire Brick Works, Brooklyn, N. Y. ... 256

Borgner & O'Brien, Phila., Pa. . . . 256
Gardner Brothers, Pittsburgh, Pa. . . . 256
Henry Maurer, New York City. . . . 256

DIETERICH'S REGENERATOR FURNACE.

Charles F. Dieterich, Baltimore, Md. . . . 238

GAS METERS.

Harris, Griffin & Co., Phila., Pa. . . . 262
American Meter Co., New York and Philadelphia. . . . 263
The Goodwin Gas Stove and Meter Co., Philadelphia, Pa. . . . 263
Helme & McIlhenny, Phila., Pa. . . . 263

GAS STOVES.

The Goodwin Gas Stove and Meter Co., Phila. Pa. . . . 264
American Meter Co., New York and Philadelphia. . . . 255

VALVES.

Ludlow Valve Manufacturing Co., Troy, N. Y. . . . 256
Chapman Valve Manufacturing Company, Boston, Mass. . . . 256

EXHAUSTERS.

P. H. & F. M. Roots, Connersville, Ind. . . . 257
Smith & Sayre Manufacturing Co., New York City. . . . 257

GAS COALS.

Penn Gas Coal Co., Phila., Pa. . . . 261
Perkins & Co., New York City. . . . 260 261
Cannelton Coal Co., New York and Philadelphia. . . . 261
New York and Cleveland Gas Coal Co., Pittsburgh, Pa. . . . 261
Newburgh Orrel Coal Co., Baltimore, Md. . . . 261
Despard Coal Co., Baltimore, Md. . . . 261
Tyrconnell Coal Co., Baltimore, Md. . . . 261
Fort Pitt Gas Coal, Pittsburgh, Pa. . . . 260
Chesapeake and Ohio R.R Coal Agency, N. Y. City. . . . 261

GAS ENGINES.

Schleicher, Schumm & Co., Phila., Pa. . . . 250

STEAM STOKERS.

A. Q. Ross, Cincinnati, Ohio. . . . 240

PURIFIER SCREENS.

George D. Cabot, Lawrence, Mass. . . . 239

BURNERS.

G. Gefrorer, Phila., Pa. . . . 256

STREET LAMPS.

J. G. Miner, New York City. . . . 250

PURIFYING MATERIAL.

Connelly & Co., New York City. . . . 254

STEAM BLOWER FOR BURNING BREESE.

H. E. Parson, New York City. . . . 250

PROCESSES.

Gwynne Harris New York City. . . . 258

EDGE'S PROCESS. REMOVING CARBON

D. D. Flemming, Jersey City, N. J. . . . 254

GAS FIXTURES.

Mitchell, Vance & Co., New York City. . . . 257

CEMENT.

S. L. Merchant, New York City. . . . 257
F. O. Norton, New York City. . . . 257

BOOKS.

Economy of Gas as a Fuel. . . . 260
Journal des Usines a Gaz. . . . 207
Gas Analyst's Manual. . . . 260
Scientific Books. . . . 258
Cathels' Gas Consumers' Manual. . . . 263
Fodell's Book-Keeping. . . . 263
Review of Gas and Water Engineering. . . . 263

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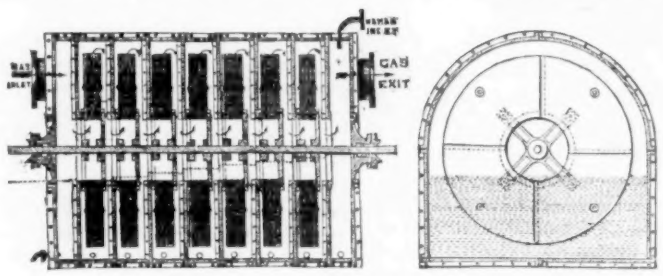

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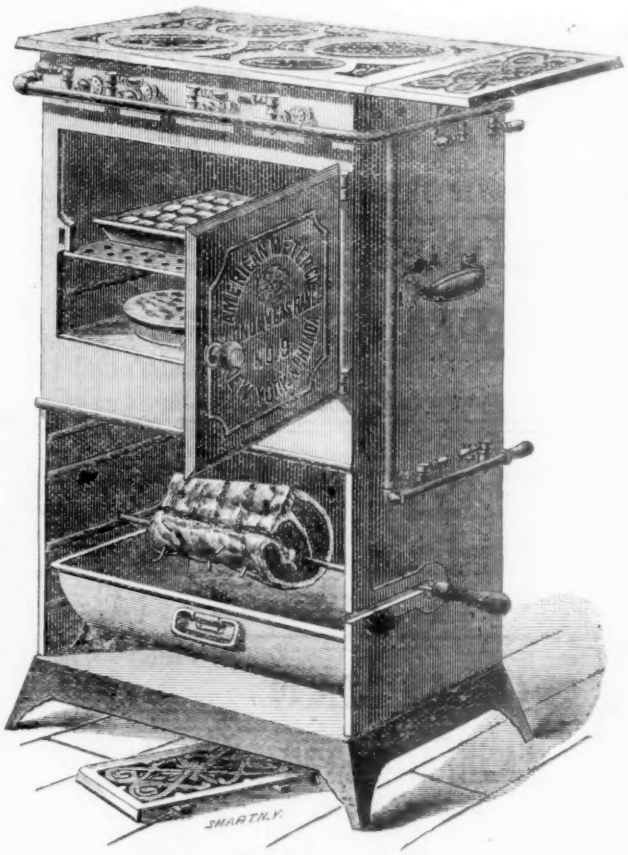

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AN OPEN ROASTER UNDER THE FIRE WITHOUT SMOKE.

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BURNERS THAT ARE PRACTICALLY INDESTRUCTIBLE FROM TIME OR USAGE.

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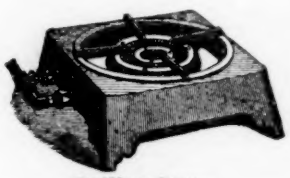
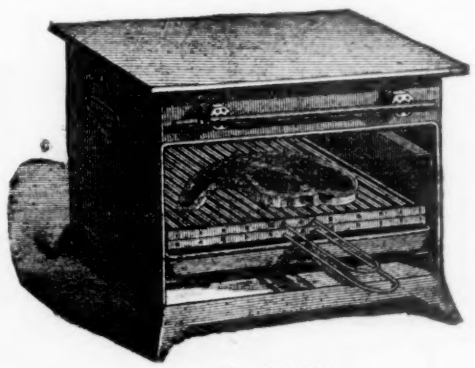


Boiling Stove.



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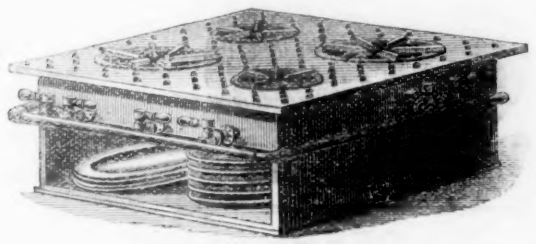
All Qualities of Gas can be Used.



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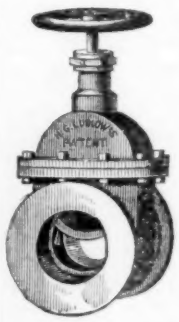

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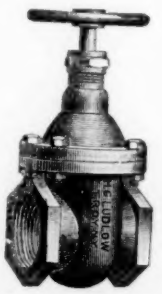

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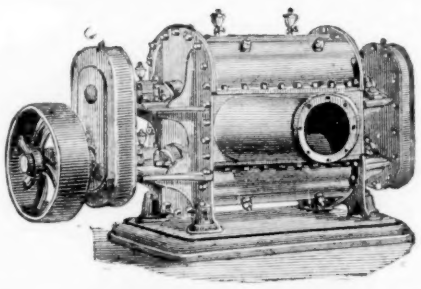

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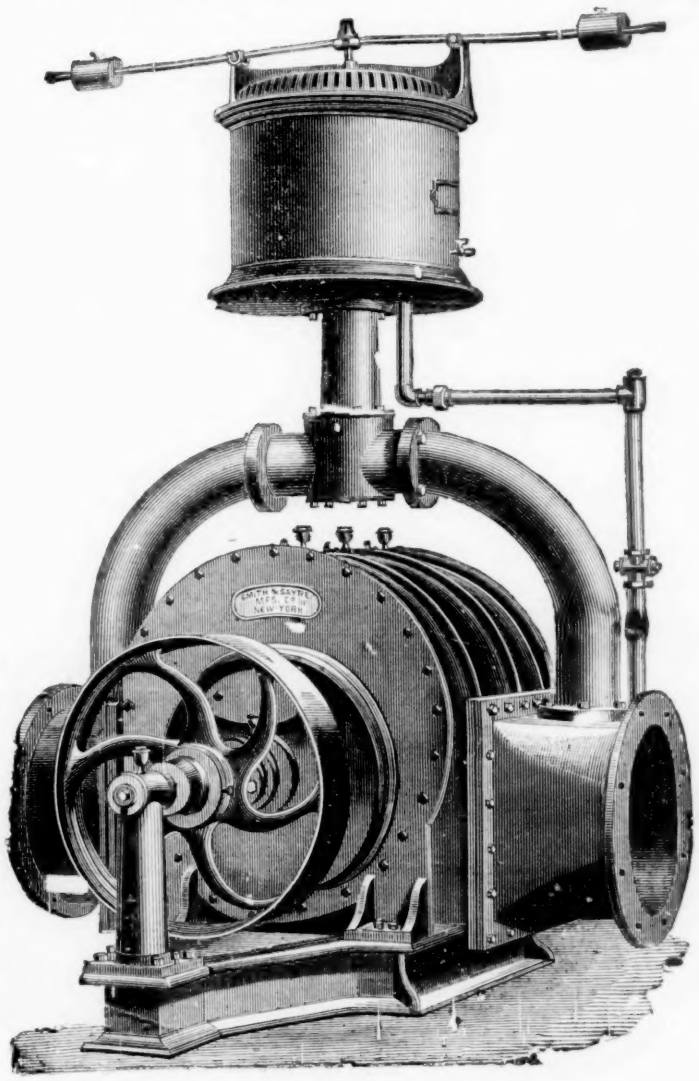

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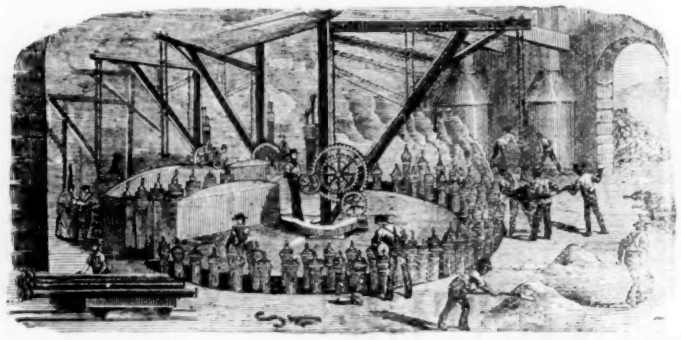

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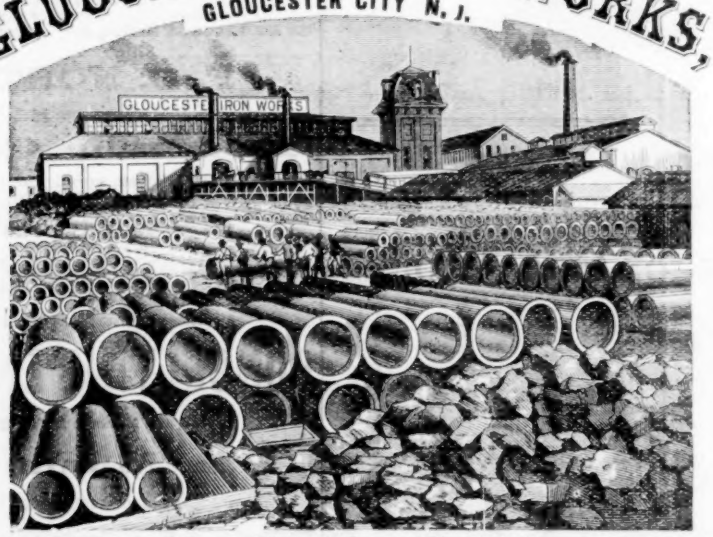

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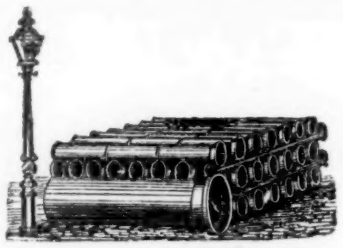

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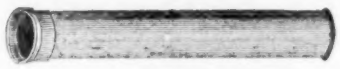

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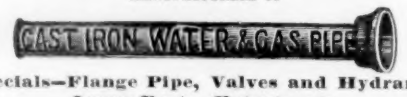

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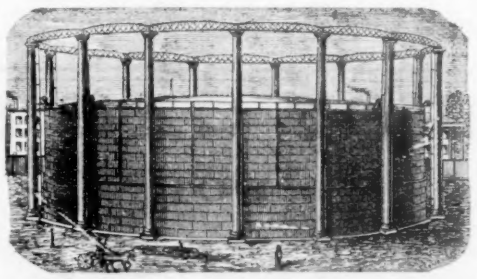

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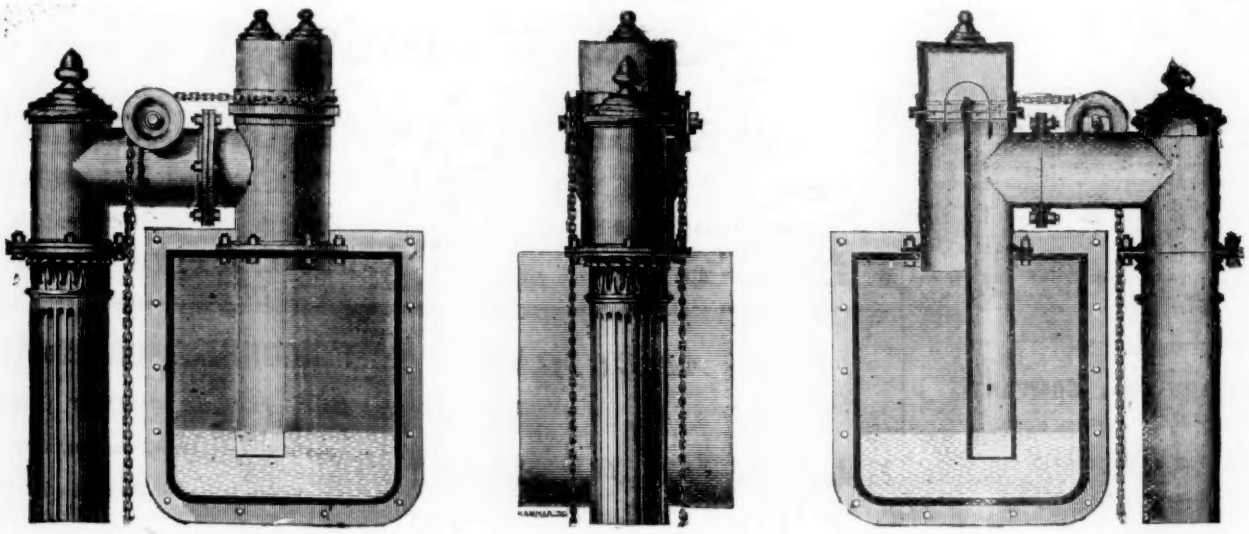

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